

4.21 SWMU 30: Residue Fill Area Unit 3Fb

SWMU 30 (Residue Fill Area 3Fb) is located to the east of Route 2, across the highway from the main plant. This area contains TDI residue fill material which was relocated from Block 13 in 1969. The TDI residue is an easily distinguished dark brown, lustrous solid, with a conchoidal fracture and similar in appearance to anthracite coal. The fill was covered with approximately 1.5 ft of silt, sand, and gravel and is now used as a parking lot.

4.21.1 RFI Scope of Work

The RFI scope of work included soil gas and geophysical surveys performed during Phase 1, and soil sampling performed during Phase 2 and 3. Some of the Phase 2 sampling was completed on an accelerated schedule during the same time frame as the Phase 1 scope of work, but is discussed herein as part of the Phase 2 work.

4.21.1.1 Phase 1 Scope of Work

Electromagnetic Survey

An electromagnetic survey (RFI Phase 1, Task 2) was conducted at SWMU 30 in the fall of 1996 (ICF Kaiser, 1997). Both quadrature and in-phase measurements were made on a 5-foot grid spacing over SWMU 30 (Figure B-5 in Appendix B). The EM (terrain conductivity) contour map for SWMU 30 (Figure B-6 in Appendix B) shows the linear accumulation of north-south trending anomalies at approximately 70E and at 130E are typical of buried utilities or subsurface drainages. Field inspection revealed evidence for a drainline at 70E but not at 130E. The linear anomaly at 130E may be a subsurface structure related to the surface tank in the southern section (220S, 120E) of the field area.

A high magnitude anomaly which extends from 200S, 130E to approximately 140S, 240E occurs in the southeastern section of the field area. Part of this anomalous zone is likely a subsurface structure related to the surface tank at 220S, 120E. However, the anomaly extends into an open field where a subsurface utility would not be expected. Therefore, part of this anomaly may be caused by buried materials or debris, especially in the eastern periphery.

Soil Gas Survey

Total VOC concentrations in soil gas are considered to be elevated if found above 100 µg/L. This is considered to be a conservative cut-off and was derived after several years of comparing actual soil chemistry results with soil gas results. Total VOC concentrations were not found above 100 µg/L in either the 2.5 ft-bgs or 7.5 ft-bgs intervals.

4.21.1.2 Phase 2 Scope of Work

The scope of work for Phase 2 was based on the findings of the accelerated Phase 2 investigation conducted in the fall of 1996, and the Phase 1 investigation data. A total of three test borings, including the accelerated samples, were installed during Phase 2 for the purposes of collecting samples for laboratory and geotechnical analysis.

Borings SM030-TB01 and SM030-TB02 were installed during the accelerated Phase 2 work. Boring SM030-TB03 was installed as part of the Phase 2 work and was placed based on the results of the accelerated borings. Boring SM030-TB01 was drilled to 21 ft-bgs, -TB02 to 23 ft-bgs, and -TB03 to refusal at 11 ft-bgs. Samples for laboratory analysis were collected from -TB01 at the surface (0 ft-bgs), the shallow subsurface (3 to 5 ft-bgs), and in the siltstone bedrock below the fill (19 to 21 ft-bgs); from -TB02 in the silt and siltstone bedrock below the fill (21 to 23 ft-bgs); and from -TB03 at the surface (0 to 1 ft-bgs), the shallow subsurface (3 to 5 ft-bgs), and from 7 to 9 ft-bgs (2-ft interval above water). There were no additional samples collected from SWMU 30 borings because no elevated OVM readings were obtained, no visual contamination was observed, and there were no perched water zones observed. The samples were submitted for analysis of SVOCs, metals, VOCs, and TOCs. Table 4.21-1 presents the complete soil analytical results for SWMU 30 and Figure 4.21-1 provides selected soil analytical results on a plan view map.

Shelby Tube samples for geotechnical analysis were collected from twin borings drilled beside SM030-TB01, -TB02, and -TB03. One sample was taken from the 1.5 to 3.5 ft-bgs interval in -TB01 and marked for sieve and hydrometer analyses. The samples from -TB02 (5 to 7 ft-bgs) and -TB03 (3 to 5 ft-bgs) were marked for sieve, hydrometer, bulk density, Atterberg limits, consolidation, and permeability analyses. All geotechnical analyses (included as Appendix E) were performed by Geotechnics, Inc.

4.21.1.3 Phase 3 Scope of Work

Two additional borings (SM030-TB04 and -TB05) were installed during November 1999 and are shown on Figure 4.21-1. These borings were installed to further characterize the western portion of SWMU 30. Borings SM030-TB04 and -TB05 were advanced to 20 and 8 ft-bgs, respectively. No elevated OVM readings were encountered in either of the Phase 3 borings.

Samples for laboratory analysis were collected from -TB04 at the surface (0-1 ft-bgs), the shallow subsurface (3 to 5 ft-bgs), and from the 2 foot interval above groundwater (14 to 16 ft-bgs); and from -TB05 at the surface (0 to 1 ft-bgs), and the shallow subsurface/2 foot interval above groundwater (2 to 4 ft-bgs). These samples were submitted to the laboratory and analyzed for 2,4-toluenediamine.

4.21.2 Field Observations

The boring logs for SWMU 30 (Appendix D) indicate that subsurface materials encountered during Phase 2 in boring SM030-TB01 are 4.5 ft of sand, gravel, rock fragments, and slag above TDI residue to 20.5 ft-bgs, and siltstone bedrock to depth. Materials encountered in SM030-TB02 are similar to those in -TB01; 5 ft of sand, gravel, rock fragments, and slag above TDI residue to 22 ft-bgs, with silt and siltstone bedrock to depth. Materials encountered in SM030-TB03 are 2.5 ft of sandy silt above shaley clay to refusal at 11 ft-bgs on sandstone bedrock. TDI residue was identified in the 3.5-4 ft-bgs interval of SM030-TB04 and in the 3.5-8 ft-bgs interval of SM030-TB05. Note that all thicknesses and depths are approximate.

Wet to saturated conditions were found at 6.5 ft-bgs in boring -TB01 and extended to the bottom of the fill material at approximately 20.5 ft-bgs. Similar conditions are presumed to exist in -TB02, but because the boring was continuously drilled from the surface to 19 ft-bgs they are not confirmed. Wet to saturated conditions were found at 9 ft-bgs in boring -TB03. Saturated conditions were encountered at 16 ft-bgs in -TB04 and 4 ft-bgs in -TB05. Organic vapors were not detected in any of the SWMU 30 borings.

4.21.3 Risk Assessment Results

4.21.3.1 Comparison to Risk-based Criteria

Table 4.21-1 provides the complete analytical results for SWMU 30, and Figure 4.21-1 summarizes the analytical results on a plan view map. Table 4.21-2 presents a summary of all

detected constituents at SWMU 30, and constituents with maximum detections or detection limits exceeding the screening criteria. In addition to maximum detected concentrations and detection limits, Table 4.21-2 also presents frequency of detection, USEPA risk-based screening criteria, default soil to groundwater SSLs (dilution attenuation factor of 20), and comparisons to the screening criteria. Bayer has been designated as an industrial facility, therefore industrial soil RBCs are applicable for RFI decisions. Residential soil RBCs are presented to fulfill USEPA Region III documentation requirements.

One SVOC (2,4-toluenediamine) has a maximum detected concentration that exceeds the Region III RBC for industrial soils, and an additional two SVOCs (benzo(a)pyrene and o,p-toluidine) have maximum detected concentrations that exceed the RBCs for residential soil only. Six organic constituents have maximum detection limits that exceed the Region III RBCs for both industrial and residential soils, while nine organic constituents have maximum detection limits that exceed the RBCs for residential soils only.

As indicated on Table 4.21-2, one VOC (methylene chloride) and one SVOC (2,4-dinitrotoluene) have maximum detected concentrations that exceed the default USEPA SSLs. In addition, 23 organic constituents have maximum detection limits that exceed the default USEPA SSLs.

4.21.3.2 Site Specific Soil Screening Levels

SSLs were derived for SWMU 30 using site-specific data to further evaluate if the constituents with maximum detected concentrations or detection limits exceeding the default USEPA SSLs could have the potential to migrate from soil to groundwater at levels of concern. Site-specific SSLs were calculated for each constituent with a maximum detection or detection limit that exceeds the default USEPA SSL. Maximum concentrations of constituents were then compared to the site-specific SSLs.

Table 4.21-3 presents the resulting SSLs, along with the maximum detections and detection limits and an indication of whether the maximum concentration exceeds the site-specific SSL. As indicated in the table, one VOC (methylene chloride) has a maximum detected concentration that exceeds the site-specific SSL. In addition, four VOCs (1,1,2,2-tetrachloroethane, cis-1,3-dichloropropene, trans-1,3-dichloropropene, and vinyl chloride) and three SVOCs (3,3'-dichlorobenzidine, bis(2-chloroethyl)ether, and n-nitrosodipropylamine) have maximum detection limits that exceed the calculated site specific SSLs for SWMU 30.

4.21.3.3 Site Specific Analysis

The above results indicate that no further action is necessary for SWMU 30. The reasons for assigning this SWMU to the NFA category include:

- Only one detected constituent (2,4-toluenediamine) exceeded the industrial RBC. This constituent was detected in only two of 14 samples, at depths of 2-4 and 3-5 ft-bgs. None of the detection limits of the other samples exceeded the industrial RBC.
- Two constituents (methylene chloride) had maximum detected concentrations that exceeded the site-specific SSL. However, in the four samples where methylene chloride was detected, each result was qualified with a "B", indicating the presence of blank contamination. Methylene chloride is known to be a common blank contaminant. Additionally, the maximum detected concentration of 0.7 mg/kg is only slightly above the site-specific SSL of 0.39 mg/kg.
- While the detection limits of some constituents exceed the site-specific SSLs, none of these constituents were ever detected. Each of these constituents had site-specific SSLs less than 0.20 mg/kg and had detection limits for soils that always exceed the respective site-specific SSLs. Also, none of these constituents had detection limits that were significantly above the method detection limits. Therefore, these detection limits are considered reasonable, are not elevated, and are unlikely to mask significant concentrations of constituents.
- While the detection limits of several constituents exceed the industrial RBCs, none of these constituents were ever detected, and all have detection limits that are comparable to their method detection limits. Also, these constituents have industrial RBCs that are 0.11 mg/kg or less, and the detection limits always exceed the respective industrial RBCs. Therefore, these detection limits are considered reasonable, are not elevated, and are unlikely to mask significant concentrations of constituents.

4.21.4 Discussions with USEPA

Bayer discussed SWMU 30 with USEPA on March 24, 1999 after submitting the Phase 2 Report and on August 17, 2000 and September 6, 2000 after submitting the initial version of the Final RFI Report. During the March 24, 1999 discussion, USEPA concurred with Bayer that no further action is required for this SWMU, pending inclusion of this area in an institutional control plan for the protection of workers while excavating based on the 2,4-TDA identified in subsurface samples. Additionally, it was agreed that four discrete samples were to be collected during Phase 3 and analyzed for 2,4-TDA.

During the August 17, 2000 discussion, the analytical data and text presented in the initial submittal of the Final RFI Report were reviewed. USEPA requested further clarification on the methylene chloride detected at 700 µg/kg and qualified as being detected in the blank. Methylene chloride was the only constituent exceeding the site specific SSLs. During the September 6, 2000 discussion, IT indicated that methylene chloride (a common laboratory contaminant) was also detected in the method blank at a concentration of 700 µg/kg. Additionally, historical groundwater analytical data for the SWMU 30 area were reviewed and methylene chloride was not identified in groundwater in the SWMU 30 area, supporting the belief that the methylene chloride is most likely associated with sampling or laboratory contamination. Although USEPA generally agreed with this belief, it was agreed that it would be prudent to include this area in the institutional control plan due to the potential presence of methylene chloride. If subsurface work is done in SWMU 30, it was agreed that soil samples would be collected and analyzed for methylene chloride. If methylene chloride is not identified, it could be removed as a constituent of interest for this SWMU in the institutional control plan. However, until the methylene chloride issue is further defined, a soil management plan for SWMU 30 will be implemented with an action level of 400 µg/kg for methylene chloride.

USEPA also asked for statistics (mean, median, 95% UCL) to be calculated for 2,4-TDA (Table 4.21-4). Based on the review of the 2,4-TDA results, USEPA confirmed the previous decision that SWMU 30 should be included in the facility's institutional control plan for subsurface work.

4.21.5 Conclusions and Recommendations

The only constituent with a maximum detection that exceeds the industrial RBC is 2,4-toluenediamine. This constituent was detected in only 3 subsurface samples and is related to samples containing TDI residue, which is a readily discernable, lustrous, brown-black solid. All of these samples were collected from the subsurface. Therefore, there is no concern related to the direct soil contact pathways. All detection limits for undetected constituents are considered reasonable and are not elevated.

Comparison of the soil analytical data to the site-specific SSLs indicates that only methylene chloride, a common blank contaminant, has a maximum detection that exceeds the site-specific SSL. Methylene chloride has not been detected in groundwater samples collected in the vicinity of this SWMU. Based on discussions with USEPA, Bayer has agreed to include the SWMU in a soil management plan for methylene chloride. More specifically, soil excavated from this area

will be sampled and analyzed for methylene chloride. If the concentration of methylene chloride exceeds 400 µg/kg, the removed soil will be properly disposed in accordance with applicable regulations. If sampling confirms that methylene chloride is a result of blank contamination, USEPA will be notified and a request to remove SWMU 30 from the soil management plan will be made.

As a result, no further action is warranted for SWMU 30. During a March 24, 1999 conference call, USEPA concurred with the no further action decision pending inclusion of this SWMU in an institutional control plan for workers that may be exposed to subsurface soils containing 2,4-toluenediamine. Bayer has agreed to include this SWMU in an institutional control plan for protection of workers performing subsurface work.

TABLE 4.21-1
Soil Analytical Results for
SWMU 30: Residue Fill Area Unit 3Fb

SAMPLE ID	SM030-TB01-0000	SM030-TB01-0305	SM030-TB01-1921	SM030-TB01-1921D	SM030-TB02-0002	SM030-TB02-0305	SM030-TB02-2123	SM030-TB03-0001
SAMPLE DEPTH(ft)	0.00-0.00	3.00-5.00	19.00-21.00	19.00-21.00	0.00-2.00	3.00-5.00	21.00-23.00	0.00-1.00
SAMPLE LOCATION	TB01	TB01	TB01	TB01	TB02	TB02	TB02	TB03
SAMPLE DATE	10/22/1996	10/22/1996	10/22/1996	10/22/1996	10/21/1996	10/21/1996	10/22/1996	7/17/1997
PARAMETER								
Volatiles (µg/kg)								
1,1,1,2-Tetrachloroethane	<100	<100	<100	<100	<100	<100	<100	<276
1,1,1-Trichloroethane	<200	<200	<200	<200	<200	<200	<200	<144
1,1,2,2-Tetrachloroethane	<100	<100	<100	<100	<100	<100	<100	<144
1,1,2-Trichloroethane	<100	<100	<100	<100	<100	<100	<100	<276
1,1-Dichloroethane	<100	<100	<100	<100	<100	<100	<100	<144
1,1-Dichloroethene	<100	<100	<100	<100	<100	<100	<100	<276
1,1-Dichloropropene	<200	<200	<200	<200	<200	<200	<200	<144
1,2,3-Trichlorobenzene	<100	<100	<100	<100	<100	<100	<100	<144
1,2,3-Trichloropropane	<200	<200	<200	<200	<200	<200	<200	<144
1,2,4-Trichlorobenzene	<100	<100	<100	<100	<100	<100	<100	<144
1,2,4-Trimethylbenzene	<100	<100	<100	<100	<100	<100	<100	<144
1,2-Dibromo-3-chloropropane	<600	<600	<600	<600	<600	<600	<600	<276
1,2-Dibromoethane	<100	<100	<100	<100	<100	<100	<100	<144
1,2-Dichlorobenzene	<100	6100	600	400	<100	1500	1700	<276
1,2-Dichloroethane	<100	<100	<100	<100	<100	<100	<100	<276
1,2-Dichloropropane	<100	<100	<100	<100	<100	<100	<100	<420
1,3,5-Trimethylbenzene	<100	<100	<100	<100	<100	<100	<100	<144
1,3-Dichlorobenzene	<100	<100	<100	<100	<100	<100	<100	<276
1,3-Dichloropropane	<100	<100	<100	<100	<100	<100	<100	<144
1,4-Dichlorobenzene	<100	800	<100	<100	<100	200	100	<276
2,2-Dichloropropane	<100	<100	<100	<100	<100	<100	<100	<144
2-Butanone	<600	<600	<600	<600	<600	<600	<600	<973
2-Chloroethyl Vinyl Ether	<200	<200	<200	<200	<200	<200	<200	<276
2-Chlorotoluene	<100	<100	<100	<100	<100	<100	<100	<144
2-Hexanone	<600	<600	<600	<600	<600	<600	<600	<420
4-Chlorotoluene	<100	<100	<100	<100	<100	<100	<100	<144
4-Methyl-2-pentanone	<600	<600	<600	<600	<600	<600	<600	<420
Acetone	<600	<600	<600	<600	<600	<600	<600	<973
Acrolein	<600	<600	<600	<600	<600	<600	<600	<2760
Acrylonitrile	<600	<600	<600	<600	<600	<600	<600	<1440
Allyl Chloride	<100	<100	<100	<100	<100	<100	<100	<144
Benzeno	<200	<200	<200	<200	<200	<200	<200	<144
Chloromethane	<100	<100	<100	<100	<100	<100	<100	<144
Bromodichloromethane	<100	<100	<100	<100	<100	<100	<100	<276
Bromoform	<100	<100	<100	<100	<100	<100	<100	<144
Bromomethane	<200	<200	<200	<200	<200	<200	<200	<144
Carbon Disulfide	<100	<100	<100	<100	<100	<100	<100	<420
Carbon Tetrachloride	<100	<100	<100	<100	<100	<100	<100	<144
Chlorobenzene	<100	<100	<100	<100	<100	<100	<100	<144
Chloroethane	<100	<100	<100	<100	<100	<100	<100	<420
Chloroform	<100	<100	<100	<100	<100	<100	<100	<144
Chloromethane	<200	<200	<200	<200	<200	<200	<200	<276
Dibromochloromethane	<100	<100	<100	<100	<100	<100	<100	<144
Dibromomethane	<200	<200	<200	<200	<200	<200	<200	<144
Dichlorodifluoromethane	<100	<100	<100	<100	<100	<100	<100	<276
Ethyl Methacrylate	<200	<200	<200	<200	<200	<200	<200	<144
Ethylbenzene	<100	<100	<100	<100	<100	<100	<100	<144
Freon 113	NA	NA	NA	NA	NA	NA	NA	1880
Freon 141b	NA	NA	NA	NA	NA	NA	NA	<144
Hexachlorobutadiene	<100	<100	<100	<100	<100	<100	<100	<276
Isopropylbenzene	<100	<100	<100	<100	<100	<100	<100	<420
Methyl Iodide	<100	<100	<100	<100	<100	<100	<100	<420
Methylene Chloride	700 B	700 B	700 B	700 B	<200	<200	700 B	<276
Naphthalene	<600	<600	<600	<600	<600	<600	<600	<144
Styrene	<100	<100	<100	<100	<100	<100	<100	<144
Tetrachloroethene	<100	<100	<100	<100	<100	<100	<100	<144
Toluene	<100	100	<100	<100	<100	<100	<100	<144
Trichloroethene	<100	<100	<100	<100	<100	<100	<100	<144
Trichlorofluoromethane	<100	<100	<100	<100	<100	<100	<100	<276
Vinyl Acetate	<600	<600	<600	<600	<600	<600	<600	<420
Vinyl Chloride	<100	<100	<100	<100	<100	<100	<100	<276
cis-1,2-Dichloroethene	<100	<100	<100	<100	<100	<100	<100	<276
cis-1,3-Dichloropropene	<100	<100	<100	<100	<100	<100	<100	<144
m+p-Xylene	<100	<100	<100	<100	<100	<100	<100	<144
n-Butylbenzene	<100	<100	<100	<100	<100	<100	<100	<144

TABLE 4.21-1
Soil Analytical Results for
SWMU 30: Residue Fill Area Unit 3Fb

SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE PARAMETER	SM030-TB01-0000 0.00-0.00 TB01 10/22/1996	SM030-TB01-0305 3.00-5.00 TB01 10/22/1996	SM030-TB01-1921 19.00-21.00 TB01 10/22/1996	SM030-TB01-1921D 19.00-21.00 TB01 10/22/1996	SM030-TB02-0002 0.00-2.00 TB02 10/21/1996	SM030-TB02-0305 3.00-5.00 TB02 10/21/1996	SM030-TB02-2123 21.00-23.00 TB02 10/22/1996	SM030-TB03-0001 0.00-1.00 TB03 7/17/1997
n-Propylbenzene	<100	<100	<100	<100	<100	<100	<100	<144
o-Xylene	<100	<100	<100	<100	<100	<100	<100	<144
p-Isopropyltoluene	<100	<100	<100	<100	<100	<100	<100	<144
sec-Butylbenzene	<100	<100	<100	<100	<100	<100	<100	<144
tert-Butylbenzene	<100	<100	<100	<100	<100	<100	<100	<144
trans-1,2-Dichloroethene	<100	<100	<100	<100	<100	<100	<100	<276
trans-1,3-Dichloropropene	<100	<100	<100	<100	<100	<100	<100	<144
trans-1,4-Dichloro-2-butene	<600	<600	<600	<600	<600	<600	<600	<1440
Semivolatiles (µg/kg)								
1,2,3-Trichlorobenzene	<200	<200	<200	<200	<200	<200	<200	<270
1,2,4,5-Tetrachlorobenzene	<200	<200	<200	<200	<200	<200	<200	<270
1,2,4-Trichlorobenzene	<200	<200	<200	<200	<200	<200	<200	<220
1,2-Dichlorobenzene	<200	7100	1700	3300	<200	7400	1500	<220
1,3-Dichlorobenzene	<200	<200	<200	<200	<200	<200	<200	<220
1,4-Dichlorobenzene	<100	<100	100	300	<100	1100	100	<220
1-Chloronaphthalene	<500	<500	<500	<500	<500	<500	<500	<550
1-Methylnaphthalene	<200	<200	<200	<200	<200	<200	<200	<220
1-Naphthylamine	<200	<200	<200	<200	<200	<200	<200	<750
2,3,4,6-Tetrachlorophenol	<200	<200	<200	<200	<200	<200	<200	<440
2,3-Dichloroaniline	<200	<200	<200	<200	<200	<200	<200	<220
2,4,5-Trichlorophenol	<200	<200	<200	<200	<200	<200	<200	<220
2,4,6-Trichlorophenol	<100	<100	<100	<100	<100	<100	<100	<220
2,4-Dichlorophenol	<100	<100	<100	<100	<100	<100	<200	<220
2,4-Dimethylphenol	<200	<200	<200	<200	<200	<200	<100	<220
2,4-Dinitrophenol	<3200	<200	<200	<200	<200	<200	<200	<1370
2,4-Dinitrotoluene	<200	0.5	<200	<200	<200	0.5	<200	<220
2,4-Tolenediamine	<1.0	<1.0	<1.0	<1.0	<100	33400	<100	<1110
2,6-Dichlorophenol	<200	<200	<200	<200	<200	<200	<200	<220
2,6-Dinitrotoluene	<200	<200	<200	<200	<200	<200	<200	<220
2-Chloronaphthalene	<200	<200	<200	<200	<200	<200	<200	<220
2-Chlorophenol	<200	<200	<200	<200	<200	<200	<200	<220
2-Methylnaphthalene	<200	<200	<200	<200	<200	<200	<200	<220
2-Naphthylamine	<200	<200	<200	<200	<200	<200	<200	<840
2-Nitroaniline	<200	<200	<200	<200	<200	<200	<200	<270
2-Nitrodiphenylamine	<200	<200	<200	<200	<200	<200	<200	<220
2-Nitrophenol	<200	<200	<200	<200	<200	<200	<200	<220
2-Picoline	<200	<200	<200	<200	<200	<200	<200	<820
3,3'-Dichlorobenzidine	<100	<100	<100	<100	<100	<100	<100	<1350
3-Methylcholanthrene	<200	<200	<200	<200	<200	<200	<200	<220
3-Nitroaniline	<100	<100	<100	<100	<100	<100	<100	<220
4,4' Methyleneedianiline	<200	<200	<200	<200	<200	<200	<200	<1950
4,6-Dinitro-o-cresol	<200	<200	<200	<200	<200	<200	<200	<220
4-Aminobiphenyl	<200	<200	<200	<200	<200	<200	<200	<220
4-Aminodiphenylamine	<200	<200	<200	<200	<200	<200	<200	<550
4-Bromophenyl phenyl ether	<200	<200	<200	<200	<200	<200	<200	<220
4-Chloro-m-cresol	<200	<200	<200	<200	<200	<200	<200	<220
4-Chlorophenylphenyl ether	<100	<100	<100	<100	<100	<100	<100	<220
4-Nitroaniline	<200	<200	<200	<200	<200	<200	<200	<220
4-Nitrophenol	<200	<200	<200	<200	<200	<200	<200	<220
5-Nitro-o-tolididine	<200	<200	<200	<200	<200	<200	<200	<220
7,12-dimethylbenz[a]anthracene	<200	<200	<200	<200	<200	<200	<200	<220
Acenaphthene	<100	<100	<100	<100	<100	<100	<100	<220
Acenaphthylene	<100	<100	<100	<100	<100	<100	<100	<220
Acetophenone	<200	<200	<200	<200	<200	<200	<200	<290
Aniline	<200	<200	<200	<200	<200	<200	<200	<310
Anthracene	<100	<100	<100	<100	<100	<100	<100	<220
Azobenzene	<200	<200	<200	<200	<200	<200	<200	<270
Benzidine	<3200	<200	<200	<200	<200	<200	<200	<3540
Benzo(a)anthracene	<200	<200	<200	<200	<200	<200	<200	<290
Benzo(a)pyrene	<100	<100	<100	<100	300 J	<100	<100	<220
Benzo(b)fluoranthene	300 J	<100	<100	<100	700 J	<100	<100	<220
Benzo(ghi)perylene	<200	<200	<200	<200	200 J	<200	<200	<240
Benzo(k)fluoranthene	<200	<200	<200	<200	<200	<200	<200	<220
Benzoic Acid	<200	<200	<200	<200	<200	<200	<200	320
Benzyl Alcohol	<100	<100	<100	<100	<200	<100	<100	<220
Benzyl butyl phthalate	<200	<200	<200	<200	<200	<200	<200	<220

TABLE 4.21-1
Soil Analytical Results for
SWMU 30: Residue Fill Area Unit 3Fb

SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE PARAMETER	SM030-TB01-0000 0.00-0.00 TB01 10/22/1996	SM030-TB01-0305 3.00-5.00 TB01 10/22/1996	SM030-TB01-1921 19.00-21.00 TB01 10/22/1996	SM030-TB01-1921D 19.00-21.00 TB01 10/22/1996	SM030-TB02-0002 0.00-2.00 TB02 10/21/1996	SM030-TB02-0305 3.00-5.00 TB02 10/21/1996	SM030-TB02-2123 21.00-23.00 TB02 10/22/1996	SM030-TB03-0001 0.00-1.00 TB03 7/17/1997
Bis(2-chloroethoxymethane)	<200	<200	<200	<200	<200	<200	<200	<220
Bis(2-chloroethyl)ether	<200	<200	<200	<200	<200	<200	<200	<220
Bis(2-chloroisopropyl)ether	<200	<200	<200	<200	<200	<200	<200	<220
Bis(2-ethylhexyl) phthalate	200 B	200 B	400 B	300 B	400 B	400 B	800 B	520
Bisphenol A	<300	8200	<300	<300	<300	<300	<300	<400
Carbazole	NA	NA	NA	NA	NA	NA	NA	R
Chrysene	<200	<200	<200	<200	300	<200	<200	<220
Cyclohexanone	<200	<200	<200	<200	<200	<200	<200	<220
Di-n-butyl phthalate	3800 B	4800 B	6600 B	4400 B	6200 B	7900 B	7200 B	590 B
Di-n-octyl phthalate	<100	<100	<100	<100	<100	<100	<100	<220
Dibenzo(a,h)anthracene	<200	<200	<200	<200	<200	<200	<200	<220
Dibenzofuran	<200	<200	<200	<200	<200	<200	<200	<220
Diethyl Phthalate	<100	400	200	300	200	700	200	<220
Dimethylphthalate	<100	<100	<100	<100	<200	<100	<100	<220
Ethyl Methane Sulfonate	<500	<500	<500	<500	<500	<500	<500	<400
Fluoranthene	<200	<200	<200	<200	400	<200	<200	<220
Fluorene	<100	<100	<100	<100	<100	<100	<100	<220
Heptachlor	NA	NA	NA	NA	NA	NA	NA	R
Hexachlorobenzene	<200	<200	<200	<200	<200	<200	<200	<220
Hexachlorobutadiene	<100	<100	<100	<100	<100	<100	<100	<220
Hexachlorocyclopentadiene	<200	<200	<200	<200	<200	<200	<200	<220
Hexachloroethane	<200	<200	<200	<200	<200	<200	<200	<220
Indeno(1,2,3-cd)pyrene	<200	<200	<200	<200	<200	<200	<200	<220
Isophorone	<200	<200	<200	<200	<200	<200	<200	<220
Methyl methane sulfonate	<200	<200	<200	<200	<200	<200	<200	<220
N-Nitrosodibutylamine	<200	<200	<200	<200	<200	<200	<200	<220
N-Nitrosodimethylamine	<200	<200	<200	<200	<200	<200	<200	<220
N-Nitrosodiphenylamine	<200	<200	<200	<200	<200	<200	<200	<290
N-Nitrosodipropylamine	<200	<200	<200	<200	<200	<200	<200	<220
N-Nitrosopiperidine	<200	<200	<200	<200	<200	<200	<200	<220
Naphthalene	<200	<200	<200	<200	<200	<200	<200	<220
Nitrobenzene	<100	<100	<100	<100	<100	<100	<100	<220
p-Chlorobenzene	<200	<200	<200	<200	<200	<200	<200	<380
p-Nitrotoluene	<200	<200	<200	<200	<200	<200	<200	<220
p-Nitrophenol	<100	<100	<100	<100	<200	<100	<100	<220
Phenacetin	<200	<200	<200	<200	<200	<200	<200	<220
Phenanthrene	<200	<200	<200	<200	300	<200	<200	250
Phenol	<100	<100	<100	<100	<100	<100	<100	<130
Pyrene	100	<100	<100	<100	400	<100	<100	<220
Pyridine	<200	<200	<200	<200	<200	<200	<200	<240
Trimethylphosphate	<200	<200	<200	<200	<200	<200	<200	<220
Triphenylphosphate	NA	NA	NA	NA	NA	NA	NA	<1110
m,p-Cresol	<500	<500	<500	<500	<500	<500	<500	<330
m-Nitrotoluene	<200	<200	<200	<200	<200	<200	<200	<220
m-Toluidine	<500	<500	<500	<500	<500	<500	<500	<440
o,p-Toluidine	<500	700	500	<500	<500	3600	<500	<1130
o-Cresol	<200	<200	<200	<200	<200	<200	<200	<220
o-Nitrotoluene	<200	<200	<200	<200	<200	<200	<200	<220
p-Chloroaniline	<200	<200	<200	<200	<200	300	<200	<220
p-Dimethylaminoazobenzene	<200	<200	<200	<200	<200	<200	<200	<220
p-Nitrotoluene	<200	<200	<200	<200	<200	<200	<200	<330
Metals (µg/kg)								
Antimony	<100	<100	<100	<100	<100	<100	<100	<442
Cadmium	<200	458	<200	<200	406	342	232	950
Chromium	5460	2480	2260	1770	6420	4620	4420	23900
Lead	<2000	<2000	2490	3280	<2000	<2000	13800	19700
Nickel	965	23600	17100	16700	3720	63200	7180	35200
Miscellaneous (µg/kg)								
Percent Moisture	NA	NA	NA	NA	NA	NA	NA	9.5 %
BTU from ECD	NA	NA	NA	NA	NA	NA	NA	NA
Ignitability (Flash Point) for S	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

NA=Not analyzed

B=Blank contamination

J=Estimated concentration

R=Data Rejected, Additional Information Provided in Appendix G

U=Nondetect at reported limit

•=detect at reported limit

TABLE 4.21-1
Soil Analytical Results for
SWMU 30: Residue Fill Area Unit 3Fb

SAMPLE ID	SM030-TB03-0305	SM030-TB03-0709	SM030-TB04-0001	SM030-TB04-0305	SM030-TB04-1416	SM030-TB05-0001	SM030-TB05-0204
SAMPLE DEPTH(ft)	3.00-5.00	7.00-9.00	0.00-1.00	3.00-5.00	14.00-16.00	0.00-1.00	2.00-4.00
SAMPLE LOCATION	TB03	TB03	TB04	TB04	TB04	TB05	TB05
PARTICLE							
Volatiles (µg/kg)							
1,1,1,2-Tetrachloroethane	< 289	< 289	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	< 150	< 150	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	< 150	< 150	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	< 289	< 289	NA	NA	NA	NA	NA
1,1-Dichloroethane	< 150	< 150	NA	NA	NA	NA	NA
1,1-Dichloroethene	< 289	< 289	NA	NA	NA	NA	NA
1,1-Dichloropropene	< 150	< 150	NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	< 150	< 150	NA	NA	NA	NA	NA
1,2,3-Trichloropropane	< 150	< 150	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	< 150	< 150	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	< 150	< 150	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	< 289	< 289	NA	NA	NA	NA	NA
1,2-Dibromoethane	< 150	< 150	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	< 289	< 289	NA	NA	NA	NA	NA
1,2-Dichloroethane	< 289	< 289	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 439	< 440	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	< 150	< 150	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	< 289	< 289	NA	NA	NA	NA	NA
1,3-Dichloropropane	< 150	< 150	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	< 289	< 289	NA	NA	NA	NA	NA
2,2-Dichloropropane	< 150	< 150	NA	NA	NA	NA	NA
2-Butanone	< 1020	< 1020	NA	NA	NA	NA	NA
2-Chloroethyl Vinyl Ether	< 289	< 289	NA	NA	NA	NA	NA
2-Chlorotoluene	< 150	< 150	NA	NA	NA	NA	NA
2-Hexanone	< 439	< 440	NA	NA	NA	NA	NA
4-Chlorotoluene	< 150	< 150	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	< 439	< 440	NA	NA	NA	NA	NA
Acetone	< 1020	< 1020	NA	NA	NA	NA	NA
Acrolein	< 2890	< 2890	NA	NA	NA	NA	NA
Acrylonitrile	< 1500	< 1500	NA	NA	NA	NA	NA
Allyl Chloride	< 150	< 150	NA	NA	NA	NA	NA
Benzene	< 150	< 150	NA	NA	NA	NA	NA
Bromobenzene	< 150	< 150	NA	NA	NA	NA	NA
Bromoform	< 150	< 150	NA	NA	NA	NA	NA
Bromomethane	< 150	< 150	NA	NA	NA	NA	NA
Bromodichloromethane	< 289	< 289	NA	NA	NA	NA	NA
Dibromoform	< 150	< 150	NA	NA	NA	NA	NA
Bromomethane	< 439	< 440	NA	NA	NA	NA	NA
Carbon Disulfide	< 439	< 440	NA	NA	NA	NA	NA
Carbon Tetrachloride	< 150	< 150	NA	NA	NA	NA	NA
Chlorobenzene	< 150	< 150	NA	NA	NA	NA	NA
Chloroethane	< 439	< 440	NA	NA	NA	NA	NA
Chloroform	< 150	< 150	NA	NA	NA	NA	NA
Chloromethane	< 289	< 289	NA	NA	NA	NA	NA
Dibromochloromethane	< 150	< 150	NA	NA	NA	NA	NA
Dibromomethane	< 150	< 150	NA	NA	NA	NA	NA
Dichlorodifluoromethane	< 289	< 289	NA	NA	NA	NA	NA
Ethyl Methacrylate	< 150	< 150	NA	NA	NA	NA	NA
Ethylbenzene	< 150	< 150	NA	NA	NA	NA	NA
Freon 113	775 J	440 J	NA	NA	NA	NA	NA
Freon 141b	< 150	< 150	NA	NA	NA	NA	NA
Hexachlorobutadiene	< 289	< 289	NA	NA	NA	NA	NA
Isopropylbenzene	< 439	< 440	NA	NA	NA	NA	NA
Methyl Iodide	< 439	< 440	NA	NA	NA	NA	NA
Methylene Chloride	< 289	< 289	NA	NA	NA	NA	NA
Naphthalene	< 150	< 150	NA	NA	NA	NA	NA
Styrene	< 150	< 150	NA	NA	NA	NA	NA
Tetrachloroethene	< 150	< 150	NA	NA	NA	NA	NA
Toluene	< 150	< 150	NA	NA	NA	NA	NA
Trichloroethene	< 150	< 150	NA	NA	NA	NA	NA
Trichlorofluoromethane	< 289	< 289	NA	NA	NA	NA	NA
Vinyl Acetate	< 439	< 440	NA	NA	NA	NA	NA
Vinyl Chloride	< 289	< 289	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	< 289	< 289	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	< 150	< 150	NA	NA	NA	NA	NA
m+p-Xylene	< 150	< 150	NA	NA	NA	NA	NA
n-Butylbenzene	< 150	< 150	NA	NA	NA	NA	NA

TABLE 4.21-1
Soil Analytical Results for
SWMU 30: Residue Fill Area Unit 3Fb

SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE	SM030-TB03-0305 3.00-5.00 TB03 7/17/1997	SM030-TB03-0709 7.00-9.00 TB03 7/17/1997	SM030-TB04-0001 0.00-1.00 TB04 11/15/1999	SM030-TB04-0305 3.00-5.00 TB04 11/15/1999	SM030-TB04-1416 14.00-16.00 TB04 11/15/1999	SM030-TB05-0001 0.00-1.00 TB05 11/15/1999	SM030-TB05-0204 2.00-4.00 TB05 11/15/1999
PARAMETER							
n-Propylbenzene	< 150	< 150	NA	NA	NA	NA	NA
o-Xylene	< 150	< 150	NA	NA	NA	NA	NA
p-Isopropyltoluene	< 150	< 150	NA	NA	NA	NA	NA
sec-Butylbenzene	< 150	< 150	NA	NA	NA	NA	NA
tert-Butylbenzene	< 150	< 150	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	< 289	< 289	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	< 150	< 150	NA	NA	NA	NA	NA
trans-1,4-Dichloro-2-butene	< 1500	< 1500	NA	NA	NA	NA	NA
Semivolatiles (µg/kg)							
1,2,3-Trichlorobenzene	< 280	< 280	<110	<120	<120	<120	<110
1,2,4,5-Tetrachlorobenzene	< 280	< 280	<120	<130	<130	<130	<120
1,2,4-Trichlorobenzene	< 230	< 230	<110	<120	<120	<120	<110
1,2-Dichlorobenzene	< 230	< 230	130	1200	<110	<100	2100
1,3-Dichlorobenzene	< 230	< 230	<91	<93	<94	<93	<90
1,4-Dichlorobenzene	< 230	< 230	<100	130	<110	<100	200
1-Chloronaphthalene	< 580	< 580	<100	<100	<110	<100	<100
1-Methylnaphthalene	< 230	< 230	200	170	<120	<120	120
1-Naphthylamine	< 790	< 790	<870	<900	<900	<890	<870
2,3,4,6-Tetrachlorophenol	< 460	< 460	<91	<93	<94	<93	<90
2,3-Dichloroaniline	< 230	< 230	<110	<120	<120	<120	<110
2,4,5-Trichlorophenol	< 230	< 230	<91	<93	<94	<93	<90
2,4,6-Trichlorophenol	< 230	< 230	<110	<120	<120	<120	<110
2,4-Dichloropheno!ol	< 230	< 230	<120	<130	<130	<130	<120
2,4-Dimethylphenol	< 230	< 230	<120	<130	<130	<130	<120
2,4-Dinitrophenol	< 1430	< 1440	<790	<820	<82	<810	<790
2,4-Dinitrotoluene	< 230	< 230	<100	<100	<110	<100	190
2,4-Toluenediamine	< 1160	< 1160	<400	2000UJ	<3600	<3500	28000J
2,6-Dichlorophenol	< 230	< 230	<120	<130	<130	<130	<120
2,6-Dinitrotoluene	< 230	< 230	<120	<130	<130	<130	<120
2-Chloronaphthalene	< 230	< 230	<120	<130	<130	<130	<120
2-Chlorophenol	< 230	< 230	<100	<100	<110	<100	<100
2-Methylnaphthalene	< 230	< 230	220	220	<120	<120	110
2-Naphthylamine	< 880	< 880	<700	<720	<73	<720	<700
Nitroaniline	< 280	< 280	<110	<120	<120	<120	<110
Nitrodiphenylamine	< 230	< 230	<91	<93	<94	<93	<90
2-Nitrophenol	< 230	< 230	<100	<100	<110	<100	<100
2-Picoline	< 860	< 860	<100	<100	<110	<100	<100
3,3'-Dichlorobenzidine	< 1410	< 1410	<270	<280	<280	<280	<270
3-Methylcholanthrene	< 230	< 230	<120	<130	<130	<130	<120
3-Nitroaniline	< 230	< 230	<68	<70	<70	<70	<68
4,4' Methyleneedianiline	< 2030	< 2040	<1400	<1500	<1500	<1500	<1400
4,6-Dinitro-o-cresol	< 230	< 230	<380	<400	<400	<390	<380
4-Aminobiphenyl	< 230	< 230	<550	<570	<580	<570	<550
4-Aminodiphenylamine	< 580	< 580	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	< 230	< 230	<120	<130	<130	<130	<120
4-Chloro-m-cresol	< 230	< 230	<150	<150	<150	<150	<150
4-Chlorophenylphenyl ether	< 230	< 230	<110	<120	<120	<120	<110
4-Nitroaniline	< 230	< 230	<91	<93	<94	<93	<90
4-Nitrophenol	< 230	< 230	<350	<360	<360	<360	<350
5-Nitro-o-toluidine	< 230	< 230	<100	<100	<110	<100	<100
7,12-dimethylbenz[a]anthracene	< 230	< 230	<160	<160	<160	<160	<160
Acenaphthene	< 230	< 230	<120	<130	<130	<130	<120
Acenaphthylene	< 230	< 230	<120	<130	<130	<130	<120
Acetophenone	< 300	< 300	<100	<100	<110	<100	<100
Aniline	< 320	< 320	<500	<510	<520	<510	<500
Anthracene	< 230	< 230	<100	<100	<110	<100	<100
Azobenzene	< 280	< 280	<120	<130	<130	<130	<120
Benzidine	< 3700	< 3700	<1400	<1500	<1500	<1500	<1400
Benzo(a)anthracene	< 300	< 300	<120	<130	<130	<130	<120
Benzo(a)pyrene	< 230	< 230	<120	<130	<130	<130	<120
Benzo(b)fluoranthene	< 230	< 230	<100	<100	<110	<100	<100
Benzo(ghi)perylene	< 250	< 250	340	<210	<210	<210	<200
Benzo(k)fluoranthene	< 230	< 230	<140	<140	<140	<140	<140
Benzoic Acid	< 230	< 230	<1200	<1300	<1300	<1300	<1200
Benzyl Alcohol	< 230	< 230	<100	<100	<110	<100	<100
Benzyl butyl phthalate	< 230	< 230	<110	<120	<120	<120	<110

TABLE 4.21-1
Soil Analytical Results for
SWMU 30: Residue Fill Area Unit 3Fb

SAMPLE ID	SM030-TB03-0305 3.00-5.00 TB03 7/17/1997	SM030-TB03-0709 7.00-9.00 TB03 7/17/1997	SM030-TB04-0001 0.00-1.00 TB04 11/15/1999	SM030-TB04-0305 3.00-5.00 TB04 11/15/1999	SM030-TB04-1416 14.00-16.00 TB04 11/15/1999	SM030-TB05-0001 0.00-1.00 TB05 11/15/1999	SM030-TB05-0204 2.00-4.00 TB05 11/15/1999
PARAMETER							
Bis(2-chloroethoxy)methane	< 230	< 230	< 110	< 120	< 120	< 120	< 110
Bis(2-chloroethyl)ether	< 230	< 230	< 100	< 100	< 110	< 100	< 100
Bis(2-chloroisopropyl)ether	< 230	< 230	< 100	< 100	< 110	< 100	< 100
Bis(2-ethylhexyl) phthalate	310	480	< 120	< 130	< 130	< 130	270
Bisphenol A	7950	< 420	< 170	< 180	< 180	< 170	< 170
Carbazole	R	R	< 79	< 82	< 82	< 81	< 79
Chrysene	< 230	< 230	< 120	< 130	< 130	< 130	< 120
Cyclohexanone	< 230	< 230	< 57	< 58	< 59	< 58	< 56
Di-n-butyl phthalate	1350 B	2290 B	110	230	170	220	200
Di-n-octyl phthalate	< 230	< 230	< 140	< 140	< 140	< 140	< 140
Dibenzo(a,h)anthracene	< 230	< 230	< 150	< 150	< 150	< 150	< 150
Dibenzofuran	< 230	< 230	< 100	< 100	< 110	< 100	< 100
Diethyl Phthalate	< 230	< 230	< 100	< 100	< 110	< 100	< 100
Dimethylphthalate	< 230	< 230	< 100	< 100	< 110	< 100	< 100
Ethyl Methane Sulfonate	< 420	< 420	< 91	< 93	< 94	< 93	< 90
Fluoranthene	< 230	< 230	< 110	< 120	< 120	< 120	< 110
Fluorene	< 230	< 230	< 120	140	< 130	< 130	280
Heptachlor	R	R	< 91	< 93	< 94	< 93	< 90
Hexachlorobenzene	< 230	< 230	< 160	< 160	< 160	< 160	< 160
Hexachlorobutadiene	< 230	< 230	< 100	< 100	< 110	< 100	< 100
Hexachlorocyclopentadiene	< 230	< 230	< 1500	< 1600	< 1600	< 1600	< 1500
Hexachloroethane	< 230	< 230	< 100	< 100	< 110	< 100	< 100
Indeno(1,2,3-cd)pyrene	< 230	< 230	< 160	< 160	< 160	< 160	< 160
Isothorone	< 230	< 230	< 140	< 140	< 140	< 140	< 140
Methyl methane sulfonate	< 230	< 230	< 110	< 120	< 120	< 120	< 110
N-Nitrosodibutylamine	< 230	< 230	< 140	< 140	< 140	< 140	< 140
N-Nitrosodimethylamine	< 230	< 230	< 100	< 100	< 110	< 100	< 100
N-Nitrosodiphenylamine	< 300	< 300	< 320	< 330	< 330	< 320	< 320
N-Nitrosodipropylamine	< 230	< 230	< 100	< 100	< 110	< 100	< 100
N-Nitrosopiperidine	< 230	< 230	< 110	< 120	< 120	< 120	< 110
Naphthalene	< 230	< 230	170	190	< 120	< 120	< 110
Nitrobenzene	< 230	< 230	< 100	< 100	< 110	< 100	< 100
Pentachlorobenzene	< 390	< 390	< 120	< 130	< 130	< 130	< 120
Pentachloronitrobenzene	< 230	< 230	< 79	< 82	< 82	< 81	< 79
Pentachlorophenol	< 230	< 230	< 280	< 290	< 290	< 280	< 280
Phenacetin	< 230	< 230	< 100	< 100	< 110	< 100	< 100
Phenanthere	< 230	< 230	180	130	< 120	< 120	150
Phenol	< 140	< 140	< 110	< 120	< 120	< 120	< 110
Pyrene	< 230	< 230	< 120	< 130	< 130	< 130	< 120
Pyridine	< 250	< 250	< 100	< 100	< 110	< 100	< 100
Trimethylphosphate	< 230	< 230	< 100	< 100	< 110	< 100	< 100
Triphenylphosphate	< 1160	< 1160	< 150	< 150	< 150	< 150	< 150
m,p-Cresol	< 350	< 350	< 200	< 210	< 210	< 210	< 200
m-Nitrotoluene	< 230	< 230	< 110	< 120	< 120	< 120	< 110
m-Toluidine	< 460	< 460	< 91	< 93	< 94	< 93	120
o,p-Toluidine	< 1180	< 1180	< 79	340	< 82	< 81	730
o-Cresol	< 230	< 230	< 91	< 93	< 94	< 93	< 90
o-Nitrotoluene	< 230	< 230	< 120	< 130	< 130	< 130	< 120
p-Chloroaniline	< 230	< 230	< 91	< 93	< 94	< 93	< 90
p-Dimethylaminoazobenzene	< 230	< 230	< 150	< 150	< 150	< 150	< 150
p-Nitrotoluene	< 350	< 350	< 100	< 100	< 110	< 100	< 100
Metals (µg/kg)							
Antimony	< 462	< 463	NA	NA	NA	NA	NA
Cadmium	950	690	NA	NA	NA	NA	NA
Chromium	22500	21100	NA	NA	NA	NA	NA
Lead	18000	17600	NA	NA	NA	NA	NA
Nickel	35900	33800	NA	NA	NA	NA	NA
Miscellaneous (µg/kg)							
Percent Moisture	14 %	14 %	11.7%	14.3%	14.9%	13.7%	11.4%
BTU from ECD	< 500 BTU	NA	NA	NA	NA	NA	NA
Ignitability (Flash Point) for S	Negative	NA	NA	NA	NA	NA	NA

Notes:

NA=Not analyzed

B=Blank contamination

J=Estimated concentration

R=Data Rejected, Additional Inform

U=Nondetect at reported limit

≤Nondetect at reported limit

TABLE 4.21-2
Comparison to Risk-Based Criteria
SWMU 30: Residue Fill Area Unit 3Fb

Constituent	Maximum Detected Concentration (mg/kg) (1)	Maximum Detection Limit for Non-Detects (mg/kg)	Frequency of Detection	EPA Region III Risk Based Concentrations For Soil (mg/kg)		USEPA Soil Screening Level	Maximum Detection Exceeds Criteria	Maximum Detection Limit for Non-Detects Exceeds Criteria
				Industrial	Residential			
VOLATILES								
1,1,2,2-Tetrachloroethane	ND (2)	< 0.15	0 / 9	29	3.2	0.003	NA	> SSL
1,1,2-Trichloroethane	ND	< 0.29	0 / 9	100	11	0.02	NA	> SSL
1,1-Dichloroethene	ND	< 0.29	0 / 9	9.5	1.1	0.06	NA	> SSL
1,2,3-Trichloropropane	ND	< 0.2	0 / 9	0.82	0.091	--	NA	> RES
1,2-Dibromo-3-chloropropane	ND	< 0.6	0 / 9	4.1	0.46	--	NA	> RES
1,2-Dibromoethane	ND	< 0.15	0 / 9	0.067	0.0075	--	NA	> IND, RES
1,2-Dichloroethane	ND	< 0.29	0 / 9	63	7	0.02	NA	> SSL
1,2-Dichloropropane	ND	< 0.44	0 / 9	84	9.4	0.03	NA	> SSL
Acrylonitrile	ND	< 1.5	0 / 9	11	1.2	--	NA	> RES
Benzene	ND	< 0.2	0 / 9	200	22	0.03	NA	> SSL
Bromomethane	ND	< 0.44	0 / 9	2900	110	0.2	NA	> SSL
Carbon Tetrachloride	ND	< 0.15	0 / 9	44	4.9	0.07	NA	> SSL
Methylene Chloride	0.7 B (3)	< 0.29	4 / 9	760	85	0.02	> SSL	> SSL
Tetrachloroethene	ND	< 0.15	0 / 9	110	12	0.06	NA	> SSL
Trichloroethene	ND	< 0.15	0 / 9	520	58	0.06	NA	> SSL
Vinyl Chloride	ND	< 0.29	0 / 9	3	0.34	0.01	NA	> SSL
cis-1,3-Dichloropropene	ND	< 0.15	0 / 9	32	3.5	0.004	NA	> SSL
trans-1,3-Dichloropropene	ND	< 0.15	0 / 9	32	3.5	0.004	NA	> SSL
SEMITOTALS								
2,4,6-Trichlorophenol	ND	< 0.23	0 / 14	520	58	0.2	NA	> SSL
2,4-Dinitrophenol	ND	< 3.2	0 / 14	4100	160	0.3	NA	> SSL
2,4-Dinitrotoluene	0.5	< 0.23	3 / 14	4100	160	0.0008	> SSL	> SSL
2,4-Toluenediamine	33.4	< 3.6	2 / 14	1.8	0.2	--	> IND, RES	> IND, RES
2,6-Dinitrotoluene	ND	< 0.23	0 / 14	2000	78	0.0007	NA	> SSL
4'-Dichlorobenzidine	ND	< 1.41	0 / 14	13	1.4	0.007	NA	> RES, SSL
azidine	ND	< 3.7	0 / 14	0.025	0.0028	--	NA	> IND, RES
Benzo(a)pyrene	0.3 J (4)	< 0.23	1 / 14	0.78	0.087	8	> RES	> RES
Bis(2-chloroethyl)ether	ND	< 0.23	0 / 14	5.2	0.58	0.0004	NA	> SSL
Dibenzo(a,h)anthracene	ND	< 0.23	0 / 14	0.78	0.087	2	NA	> RES
N-Nitrosodibutylamine	ND	< 0.23	0 / 14	1.1	0.12	--	NA	> RES
N-Nitrosodimethylamine	ND	< 0.23	0 / 14	0.11	0.013	--	NA	> IND, RES
N-Nitrosodipropylamine	ND	< 0.23	0 / 14	0.82	0.091	0.00005	NA	> RES, SSL
Nitrobenzene	ND	< 0.23	0 / 14	1000	39	0.1	NA	> SSL
Pentachlorophenol	ND	< 0.29	0 / 14	48	5.3	0.03	NA	> SSL
o,p-Tolidine	3.6	< 1.18	4 / 14	30	3.4	--	> RES	No

(1) "mg/kg" - Units reported in milligrams per kilogram (equivalent to parts per million) unless otherwise noted.

(2) ND - Not detected.

(3) "B" - Estimated value, biased low.

(4) "J" - Estimated value.

--" - Value not available for this constituent.

TABLE 4.21-3
Site-Specific Soil Screening
SWMU 30: Residue Fill Area Unit 3Fb

Constituent	Maximum Detected Concentration (mg/kg) (1)	Maximum Detection Limit for Non-Detects (mg/kg)	USEPA SSL (2) (mg/kg)	Site-Specific SSL (mg/kg)	Maximum Detect Exceeds Site-Specific SSL	Maximum Detection Limit Exceeds Site-Specific SSL
VOLATILES						
1,1,2,2-Tetrachloroethane	ND (3)	< 0.15	0.003	0.011	NA	Yes
1,1,2-Trichloroethane	ND	< 0.29	0.02	0.43	NA	No
1,1-Dichloroethene	ND	< 0.29	0.06	1.1	NA	No
1,2-Dichloroethane	ND	< 0.29	0.02	0.44	NA	No
1,2-Dichloropropane	ND	< 0.44	0.03	0.66	NA	No
Benzene	ND	< 0.2	0.03	0.78	NA	No
Bromomethane	ND	< 0.44	0.2	0.67	NA	No
Carbon Tetrachloride	ND	< 0.15	0.07	1.7	NA	No
Methylene Chloride	0.7 B (4)	< 0.29	0.02	0.39	Yes	No
Tetrachloroethene	ND	< 0.15	0.06	1.6	NA	No
Trichloroethene	ND	< 0.15	0.06	1.7	NA	No
Vinyl Chloride	ND	< 0.29	0.01	0.18	NA	Yes
cis-1,3-Dichloropropene	ND	< 0.15	0.004	0.01	NA	Yes
trans-1,3-Dichloropropene	ND	< 0.15	0.004	0.01	NA	Yes
SEMOVOLATILES						
2,4,6-Trichlorophenol	ND	< 0.23	0.2	4.2	NA	No
2,4-Dinitrophenol	ND	< 3.2	0.3	16	NA	No
2,4-Dinitrotoluene	0.5	< 0.23	0.0008	16	No	No
2,6-Dinitrotoluene	ND	< 0.23	0.0007	6.4	NA	No
3,3'-Dichlorobenzidine	ND	< 1.41	0.007	0.19	NA	Yes
Bis(2-chloroethyl)ether	ND	< 0.23	0.0004	0.00078	NA	Yes
N-Nitrosodipropylamine	ND	< 0.23	0.00005	0.00095	NA	Yes
Nitrobenzene	ND	< 0.23	0.1	0.56	NA	No
Pentachlorophenol	ND	< 0.29	0.03	1	NA	No

(1) "mg/kg" - Units reported in milligrams per kilogram (equivalent to parts per million) unless otherwise noted.

(2) "SSL" - Soil Screening Level.

(3) ND - Not detected.

(4) "B" - Estimated value, biased low.



SM030-TB02				
SAMPLE	DEPTH(ft)	0.00-2.00	3.00-5.00	21.00-23.00
1,2-Dichlorobenzene	<100	1500	1700	
1,4-Dichlorobenzene	<100	200	100	
1,2-Dichlorobenzene	<200	7400	1500	
1,4-Dichlorobenzene	<100	1100	100	
2,4-Dinitrotoluene	<200	5	<200	
2,4-Toluenediamine	<100	33400	<100	
Bis(2-ethylhexyl) phthalate	400 B	400 B	800 B	
Chrysene	300	<200	<200	
Di-n-butyl phthalate	6200 B	7900 B	7200 B	
Diethyl Phthalate	200	700	200	
Fluoranthene	400	<200	<200	
Phenanthrene	300	<200	<200	
Pyrene	400	<100	<100	
o,p-Toluidine	<500	3600	<500	
p-Chloroaniline	<200	300	<200	
Cadmium	406	342	232	
Chromium	6420	4620	4420	
Lead	<2000	<2000	13800	
Nickel	3720	63200	7180	

SM030-TB01					
SAMPLE	DEPTH(ft-bgs)	0.00-0.00	3.00-5.00	19.00-21.00	19.00-21.00
1,2-Dichlorobenzene	<100	6100	600	400	
1,2-Dichlorobenzene	<200	7100	1700	3300	
1,4-Dichlorobenzene	<100	100	300		
Bis(2-ethylhexyl) phthalate	200 B	200 B	400 B	300 B	
Bisphenol A	<300	8200	<300	<300	
Di-n-butyl phthalate	3800 B	4800 B	6600 B	4400 B	
Diethyl Phthalate	<100	400	200	300	
o,p-Toluidine	<500	700	500	<500	
Cadmium	<200	458	<200	<200	
Chromium	5460	2480	2260	1770	
Lead	<2000	<2000	2490	3280	
Nickel	965	23600	17100	16700	

LEGEND:



TEST BORING LOCATION



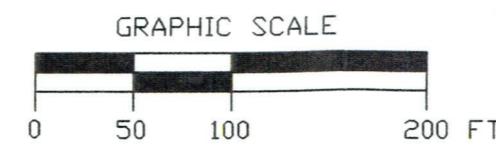
SWMU BOUNDARY

NOTES:

- "D" DENOTES DUPLICATE SAMPLE
- "FD" DENOTES FIELD DUPLICATE SAMPLE
- "J" DENOTES ESTIMATED VALUE
- "K" DENOTES ESTIMATED VALUE BIASED HIGH
- "L" DENOTES ESTIMATED VALUE BIASED LOW
- "B" DENOTES DETECTED IN LABORATORY BLANKS
- "NA" DENOTES NOT ANALYZED
- "RS" DENOTES RESAMPLED
- "<" DENOTES NOT DETECTED AT INDICATED DETECTION LIMIT
- TEST BORING LOCATIONS WERE LOCATED BY PARSONS SURVEYING.

BORING	
DEPTH	X
PARAMETER	Y

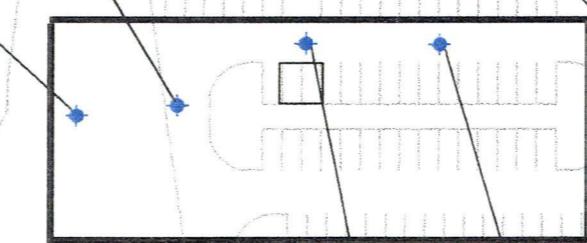
DEPTH BELOW GROUND
GROUND IN FEET
ANALYTICAL RESULTS IN ug/kg



BEAVER RUN

LOCATED ON

WV. STATE LINE #2



SWMU 30

SM030-TB04			
SAMPLE	DEPTH(ft)	0.00-1.00	2.00-4.00
1,2-Dichlorobenzene	<100	2100	
1,4-Dichlorobenzene	<100	200	
1-Methylnaphthalene	<120	120	
2,4-Dinitrotoluene	<100	190	
2,4-Toluenediamine	<3500	28000J	
Di-n-butyl phthalate	220	200	
Fluorene	<130	280	
Phenanthrene	<120	150	
m-Toluidine	<93	120	
o,p-Toluidine	<81	730	

SM030-TB03				
SAMPLE	DEPTH(ft)	0.00-1.00	3.00-5.00	7.00-9.00
Freon 113	1880	775 J	440 J	
Benzoic Acid	320	< 230	< 230	
Bis(2-ethylhexyl) phthalate	< 400	310	480	
Bisphenol A	590 B	7950	< 420	
Di-n-butyl phthalate	590 B	1350 B	2290 B	
Cadmium	950	950	590	
Chromium	23900	22500	21100	
Lead	19700	18000	17600	
Nickel	35200	35900	33800	

BAYER CORPORATION
NEW MARTINSVILLE, WEST VIRGINIA

IT Corporation

SOIL BORING LOCATIONS WITH ANALYTICAL
RESULTS FOR SWMU 30
RCRA FACILITY INVESTIGATION

DATE: 1/16/00

DR.: B. SNYDER

SCALE: 1"=100'

FILE NAME:800588-B21

FIGURE 4.21-1

5.0 PHASE 2 RFI CONCRETE CHIP SAMPLING SUMMARY

In accordance with the Work Plan (ICF Kaiser, 1996), concrete chip sampling (RFI Task 6) was performed in conjunction with the geoprobe and hollow stem auger soil sampling (RFI Task 5) at SWMUs 3 and 28. This section presents the scope of work, field data, and observations during sampling activities, and laboratory analytical results.

An unsuccessful attempt was made to collect the concrete chip samples as described in the QAPP Addendum (Appendix B-1 of the ICF Kaiser Work Plan, 1996). The dispersal of concrete chips could not be predicted using the hammer and chisel, which caused the concrete chips to land in puddles and in possibly contaminated soils, rendering them unacceptable for analysis. An alternative method was developed and used. The concrete chips were generated by using a slowly turning decontaminated lead auger and bit on a HSA drill rig. By applying very light downward pressure, the lead auger and bit teeth gently chipped the concrete into pea-sized chips that were easily collected and placed into the appropriate sample jar. Sampling depths using this process were 0 to 0.5 inches.

5.1 SWMU 3: HYDROBLASTING STATION

SWMU 3 (Hydroblasting Station) is a 24 ft x 36 ft concrete pad which slopes to a below grade sump which was used to hold water and waste from washing operations. The concrete pad was in service for several months during 1980. The area was used to clean equipment by removing solids, which had accumulated during landfill operation and movement of waste in SWMU 1 (South Landfill). The hydroblasting station was constructed within the confines of the South Landfill (SWMU 1).

5.1.1 Phase 2 Scope of Work

The concrete pad at the Hydroblasting Station was sampled to determine whether potentially hazardous materials have accumulated in the concrete. Concrete chips from five locations on the concrete pad were consolidated and collected in addition to the geoprobe and HSA soil sampling at SWMU 3. With the exception of the sample collection method change described above, this work was performed in accordance to the Work Plan.

The five sampling locations on the SWMU 3 pad were selected on the basis of visual evidence of staining (one near each corner and at a fracture in the center). Chips from the five individual

sampling locations were composited into concrete chip sample SM004-CC01. The sample was marked for VOC, SVOC, and selected metals analyses. Bayer Corporation performed the SVOC and metals analyses and contracted Lancaster Laboratories to perform the VOC analysis. The complete analytical results for both SWMUs 3 and 28 are presented on Table 5-1. Figure 5-1 provides selected analytical results (SWMU 3) on a plan view map.

5.1.2 Analytical Results: SWMU 3

The analytical results from the concrete samples at SWMU 3 detected the following organic compounds, all of these are at concentrations less than their respective USEPA Region III Industrial RBC: chlorobenzene (3.59 mg/kg), Freon 113 (0.267 mg/kg), 1,2,4-Trichlorobenzene (18.8 mg/kg), aniline (7.15 mg/kg), bis (2-ethylhexyl) phthalate (8.04 mg/kg), bisphenol A (146 mg/kg), o,p-chloroaniline (178 mg/kg). Cadmium (0.52 mg/kg), Chromium (7.84 mg/kg), lead (3.733 mg/kg), and nickel (6.57 mg/kg) were detected at concentrations less than the USEPA Region 3 industrial RBC for soil. Because these sample results were from concrete chip and not soil samples, it is believed that comparison to the industrial RBC for soil is conservative. Therefore, no further action is warranted for this concrete pad.

5.2 SWMU 28: IRON OXIDE AREA 28A

The Iron Oxide Area is located in the southeast corner of Block 28. This unit consisted of portable steel tanks and tank trailers used to store aniline still bottoms.

This area was used to contain aniline still bottoms, which contain aniline and trace amounts of nitrobenzene. Leakage from a valve onto the gravel was noted in 1986 and staining of the gravel area outside the northeast corner of the pad was noted. The production of aniline still bottoms ceased in 1991. This area now consists of a stained 20 ft x 40 ft concrete slab surrounded by gravel. A 4-inch high berm borders both the north and south sides of the pad.

5.2.1 Phase 2 Scope of Work

The concrete pad at Iron Oxide Area 28A was sampled to determine whether potentially hazardous materials have accumulated in the concrete. Concrete chips from five stained areas of concrete were collected in addition to the geoprobe soil sampling at SWMU 28.

ICF Kaiser personnel chose five locations on the pad where staining was apparent as the sampling locations. Samples from each of these locations were composited into concrete chip

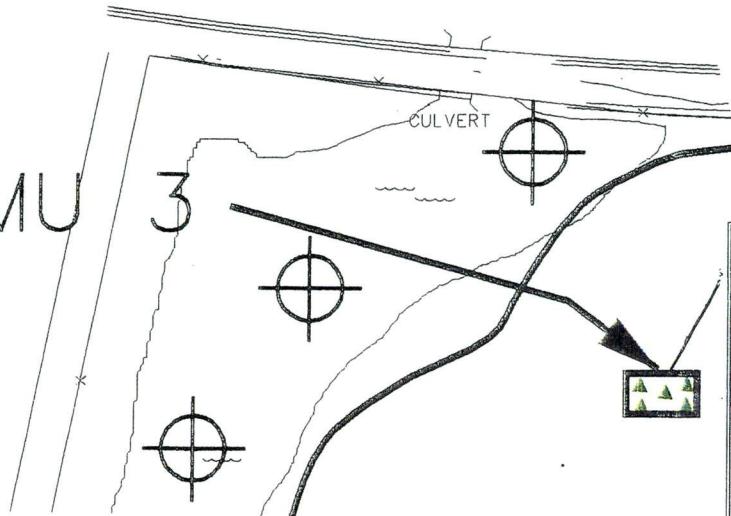
sample SM028-CC01. The sample was marked for VOC, SVOC, and selected metals analyses. Bayer Corporation performed the SVOC and Metals analyses and contracted Lancaster Laboratories to perform the VOC analysis. The complete analytical results are presented on Table 5-1 and Figure 5-2 provides selected analytical results on a plan view map.

5.2.2 Analytical Results: SWMU 28

The analytical results from the concrete samples at SWMU 28 did not detect any VOCs or SVOCs. Chromium (15.8 mg/kg), lead (6.9 mg/kg), and nickel (10.4 mg/kg) were detected at concentrations less than the USEPA Region III industrial RBC for soil. Because these sample results were from concrete chip and not soil samples, it is believed that comparison to the industrial RBC for soil is conservative. Therefore, no further action is warranted for this concrete pad.



SWMU 3



SM004-CC01 - Composite	
SAMPLE DEPTH (ft-bgs)	
Chlorobenzene	3590
Freon 113	267 JB
1,2,4-Trichlorobenzene (SVOA)	18800
Aniline	7150 J
Bis(2-ethylhexyl) phthalate	8040
Bisphenol A	146000 J
o,p-Toluidine	28400 J
p-Chloroaniline	178000
Cadmium	520 J
Chromium	7840 J
Lead	3733 J
Nickel	6570 J

LEGEND:

▲ INDIVIDUAL CONCRETE CHIP LOCATION



SWMU BOUNDARY

NOTES:

1. "D" DENOTES DUPLICATE SAMPLE
"FD" DENOTES DIED DUPLICATE SAMPLE
"J" DENOTES ESTIMATED VALUE
"K" DENOTES ESTIMATED VALUE BIASED HIGH
"L" DENOTES ESTIMATED VALUE BIASED LOW
"B" DENOTES DETECTED IN LABORATORY BLANKS
"R" DENOTES REJECTED DATA
"NA" DENOTES NOT ANALYZED
"RS" DENOTES RESAMPLED
2. "<" DENOTES NOT DETECTED AT INDICATED DETECTION LIMIT
3. TEST BORTING LOCATIONS WERE LOCATED BY PARSONS SURVEYING

BORING	DEPTH BELOW GROUND	
DEPTH	X	SURFACE IN FEET
PARAMETER	Y	ANALYTICAL RESULTS IN ug/kg

0 200 400

SCALE IN FEET

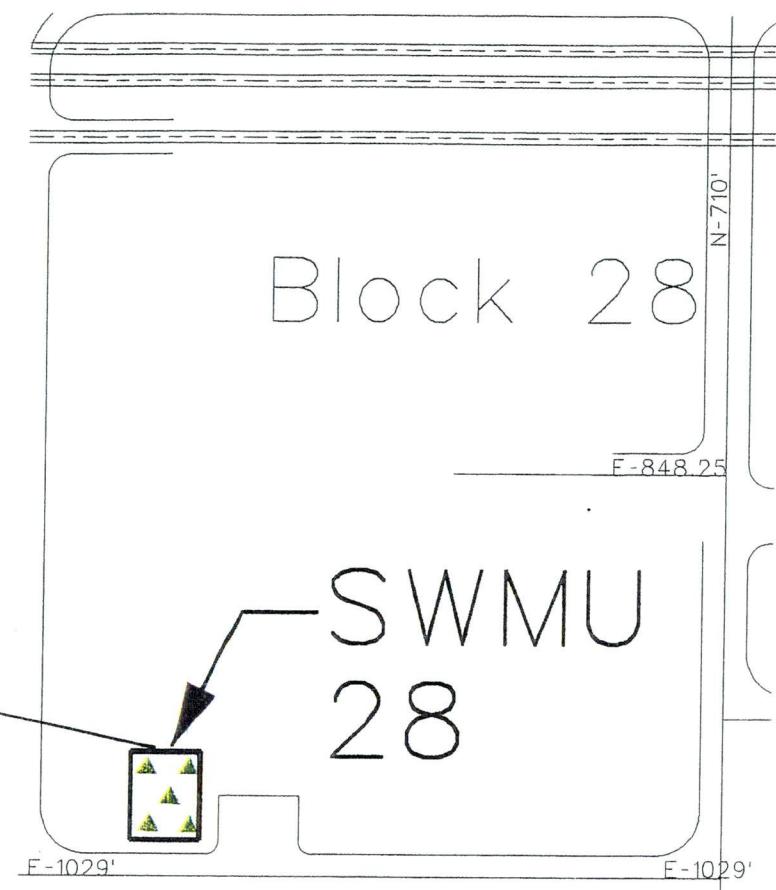
FIGURE 5-1

IT Corporation

CONCRETE CHIP SAMPLING LOCATIONS WITH ANALYTICAL RESULTS FOR SWMU 3			
DRAWN BY	B.S.		
CHK'D BY	B.R.		
DATE	1/5/00		
SCALE	AS NOTED	JOB NO.	800588
		DIG. NO.	40153107



SM028-CC01 - Composite	
SAMPLE DEPTH (ft-bgs)	0 - 1
Chromium	15800
Lead	6920
Nickel	10400



NOTES:

1. "D" DENOTES DUPLICATE SAMPLE
"FD" DENOTES DIELD DUPLICATE SAMPLE
"J" DENOTES ESTIMATED VALUE
"K" DENOTES ESTIMATED VALUE BIASED HIGH
"L" DENOTES ESTIMATED VALUE BIASED LOW
"B" DENOTES DETECTED IN LABORATORY BLANKS
"R" DENOTES REJECTED DATA
"NA" DENOTES NOT ANALYZED
"RS" DENOTES RESAMPLED
2. "<" DENOTES NOT DETECTED AT INDICATED DETECTION LIMIT
3. TEST BORTING LOCATIONS WERE LOCATED BY PARSONS SURVEYING

BORING	DEPTH BELOW GROUND	
DEPTH	X	SURFACE IN FEET
PARAMETER	Y	ANALYTICAL RESULTS IN ug/kg

LEGEND:

▲ INDIVIDUAL CONCRETE CHIP LOCATION



SWMU BOUNDARY



SCALE IN FEET

FIGURE 5-2

IT Corporation

CONCRETE CHIP SAMPLING LOCATIONS WITH ANALYTICAL RESULTS FOR SWMU 28		
DRAWN BY	B.S.	
CHK'D BY	B.R.	
DATE	1/5/00	
SCALE	AS NOTED	JOB NO. 800588 DWG NO. 40153107

TABLE 5-1
Concrete Chip Analytical Results
SWMUs 3 and 28

SAMPLE ID	SM004-CC01-0001	SM028-CC01-0001
SAMPLE DEPTH(ft)	0.00-0.05	0.00-0.05
SAMPLE LOCATION	CC01	CC01
SAMPLE DATE	7/18/1997	7/14/1997
PARAMETER		
Volatiles ($\mu\text{g}/\text{kg}$)		
1,1,1,2-Tetrachloroethane	< 256	< 257
1,1,1-Trichloroethane	< 133	< 134
1,1,2,2-Tetrachloroethane	< 133	< 134
1,1,2-Trichloroethane	< 256	< 257
1,1-Dichloroethane	< 133	< 134
1,1-Dichloroethene	< 256	< 257
1,1-Dichloropropene	< 133	< 134
1,2,3-Trichlorobenzene (VOAS)	< 133	< 134
1,2,3-Trichloropropane	< 133	< 134
1,2,4-Trichlorobenzene (VOAS)	< 133	< 134
1,2,4-Trimethylbenzene	< 133	< 134
1,2-Dibromo-3-chloropropane	< 256	< 257
1,2-Dibromoethane	< 133	< 134
1,2-Dichlorobenzene (VOAS)	< 256	< 257
1,2-Dichloroethane	< 256	< 257
1,2-Dichloropropane	< 390	< 391
1,3,5-Trimethylbenzene	< 133	< 134
1,3-Dichlorobenzene (VOAS)	< 256	< 257
1,3-Dichloropropane	< 133	< 134
1,4-Dichlorobenzene (VOAS)	< 256	< 257
2,2-Dichloropropane	< 133	< 134
2-Butanone	< 902	< 905
2-Chloroethyl Vinyl Ether	< 256	< 257
2-Chlorotoluene	< 133	< 134
2-Hexanone	< 390	< 391
4-Chlorotoluene	< 133	< 134
4-Methyl-2-pentanone	< 390	< 391
Acetone	< 902	< 905
Acrolein	< 2560	< 2570
Acrylonitrile	< 1330	< 1340
Allyl Chloride	< 133	< 134
Benzene	< 133	< 134
Bromobenzene	< 133	< 134
Bromochloromethane	< 133	< 134
Bromodichloromethane	< 256	< 257
Bromoform	< 133	< 134
Bromomethane	< 390	< 391
Carbon Disulfide	< 390	< 391
Carbon Tetrachloride	< 133	< 134
Chlorobenzene	3590	< 134
Chloroethane	< 390	< 391
Chloroform	< 133	< 134
Chloromethane	< 256	< 257
Dibromochloromethane	< 133	< 134
Dibromomethane	< 133	< 134
Dichlorodifluoromethane	< 256	< 257
Ethyl Methacrylate	< 133	< 134
Ethylbenzene	< 133	< 134

TABLE 5-1
Concrete Chip Analytical Results
SWMUs 3 and 28

PARAMETER	SAMPLE ID	SM004-CC01-0001	SM028-CC01-0001
	SAMPLE DEPTH(ft)	0.00-0.05	0.00-0.05
	SAMPLE LOCATION	CC01	CC01
SAMPLE DATE		7/18/1997	7/14/1997
Freon 113	267 JB	< 257	
Freon 141b	< 133	< 134	
Hexachlorobutadiene (VOAS)	< 256	< 257	
Isopropylbenzene	< 390	< 391	
Methyl Iodide	< 390	< 391	
Methylene Chloride	< 256	< 257	
Naphthalene (VOAS)	< 133	< 134	
Styrene	< 133	< 134	
Tetrachloroethene	< 133	< 134	
Toluene	< 133	< 134	
Trichloroethene	< 133	< 134	
Trichlorofluoromethane	< 256	< 257	
Vinyl Acetate	< 390	< 391	
Vinyl Chloride	< 256	< 257	
cis-1,2-Dichloroethene	< 256	< 257	
cis-1,3-Dichloropropene	< 133	< 134	
m+p-Xylene	< 133	< 134	
n-Butylbenzene	< 133	< 134	
n-Propylbenzene	< 133	< 134	
o-Xylene	< 133	< 134	
p-Isopropyltoluene	< 133	< 134	
sec-Butylbenzene	< 133	< 134	
tert-Butylbenzene	< 133	< 134	
trans-1,2-Dichloroethene	< 256	< 257	
trans-1,3-Dichloropropene	< 133	< 134	
trans-1,4-Dichloro-2-butene	< 1330	< 1340	
Semivolatiles ($\mu\text{g/kg}$)			
1,2,3-Trichlorobenzene (SVOA)	< 5050	< 2470	
1,2,4,5-Tetrachlorobenzene	< 5050	< 2470	
1,2,4-Trichlorobenzene (SVOA)	18800	< 2060	
1,2-Dichlorobenzene (SVOA)	< 4210 J	< 2060	
1,3-Dichlorobenzene (SVOA)	< 4210	< 2060	
1,4-Dichlorobenzene (SVOA)	< 4210	< 2060	
1-Chloronaphthalene	< 10500	< 5140	
1-Methylnaphthalene	< 4210	< 2060	
1-Naphthylamine	< 14300	< 6990	
2,3,4,6-Tetrachlorophenol	< 8410	< 4110	
2,3-Dichloroaniline	< 4210	< 2060	
2,4,5-Trichlorophenol	< 4210	< 2060	
2,4,6-Trichlorophenol	< 4210	< 2060	
2,4-Dichlorophenol	< 4210	< 2060	
2,4-Dimethylphenol	< 4210	< 2060	
2,4-Dinitrophenol	< 26100	< 12800	
2,4-Dinitrotoluene	< 4210	< 2060	
2,4-Toluenediamine	< 21000	< 10300	
2,6-Dichlorophenol	< 4210	< 2060	
2,6-Dinitrotoluene	< 4210	< 2060	
2-Chloronaphthalene	< 4210	< 2060	

TABLE 5-1
Concrete Chip Analytical Results
SWMUs 3 and 28

SAMPLE ID	SM004-CC01-0001	SM028-CC01-0001
SAMPLE DEPTH(ft)	0.00-0.05	0.00-0.05
SAMPLE LOCATION	CC01	CC01
SAMPLE DATE	7/18/1997	7/14/1997
PARAMETER		
2-Chlorophenol	< 4210	< 2060
2-Methylnaphthalene	< 4210	< 2060
2-Naphthylamine	< 16000	< 7810
2-Nitroaniline	< 5050	< 2470
2-Nitrodiphenylamine	< 4210	< 2060
2-Nitrophenol	< 4210	< 2060
2-Picoline	< 15600	< 7610
3,3'-Dichlorobenzidine	< 25700	< 12500
3-Methylcholanthrene	< 4210	< 2060
3-Nitroaniline	< 4210	< 2060
4,4' Methyleneedianiline	< 37000 J	< 18100
4,6-Dinitro-o-cresol	< 4210	< 2060
4-Aminobiphenyl	< 4210	< 2060
4-Aminodiphenylamine	< 10500	< 5140
4-Bromophenyl phenyl ether	< 4210	< 2060
4-Chloro-m-cresol	< 4210	< 2060
4-Chlorophenylphenyl ether	< 4210	< 2060
4-Nitroaniline	< 4210	< 2060
4-Nitrophenol	< 4210 J	< 2060 J
5-Nitro-o-toluidine	< 4210	< 2060
7,12-dimethylbenz[a]anthracene	< 4210	< 2060
Acenaphthene	< 4210	< 2060
Acenaphthylene	< 4210	< 2060
Acetophenone	< 5470	< 2670
Aniline	7150 J	< 2880
Anthracene	< 4210	< 2060
Azobenzene	< 5050	< 2470
Benzidine	< 67300	< 32900
Benzo(a)anthracene	< 5470	< 2670
Benzo(a)pyrene	< 4210	< 2060
Benzo(b)fluoranthene	< 4210	< 2060
Benzo(ghi)perylene	< 4630	< 2260
Benzo(k)fluoranthene	< 4210	< 2060
Benzoic Acid	< 4210	< 2060
Benzyl Alcohol	< 4210	< 2060
Benzyl butyl phthalate	< 4210	< 2060
Bis(2-chloroethoxymethane)	< 4210	< 2060
Bis(2-chloroethyl)ether	< 4210	< 2060
Bis(2-chloroisopropyl)ether	< 4210	< 2060
Bis(2-ethylhexyl) phthalate	8040	< 2470
Bisphenol A	146000 J	< 3700
Carbazole	R	< 10300
Chrysene	< 4210	< 2060
Cyclohexanone	< 4210	< 2060
Di-n-butyl phthalate	< 4210	< 2060
Di-n-octyl phthalate	< 4210	< 2060
Dibenzo(a,h)anthracene	< 4210	< 2060
Dibenzofuran	< 4210	< 2060
Diethyl Phthalate	< 4210	< 2060
Dimethylphthalate	< 4210	< 2060
Ethyl Methane Sulfonate	< 7570	< 3700

TABLE 5-1
Concrete Chip Analytical Results
SWMUs 3 and 28

SAMPLE ID	SM004-CC01-0001	SM028-CC01-0001
SAMPLE DEPTH(ft)	0.00-0.05	0.00-0.05
SAMPLE LOCATION	CC01	CC01
SAMPLE DATE	7/18/1997	7/14/1997
PARAMETER		
Fluoranthene	< 4210	< 2060
Fluorene	< 4210 J	< 2060 J
Heptachlor	R	< 2260
Hexachlorobenzene	< 4210	< 2060
Hexachlorobutadiene (SVOA)	< 4210	< 2060
Hexachlorocyclopentadiene	< 4210	< 2060
Hexachloroethane	< 4210	< 2060
Indeno(1,2,3-cd)pyrene	< 4210	< 2060
Isophorone	< 4210	< 2060
Methyl methane sulfonate	< 4210	< 2060
N-Nitrosodibutylamine	< 4210	< 2060
N-Nitrosodimethylamine	< 4210 J	< 2060 J
N-Nitrosodiphenylamine	< 5470	< 2670
N-Nitrosodipropylamine	< 4210	< 2060
N-Nitrosopiperidine	< 4210	< 2060
Naphthalene (SVOA)	< 4210	< 2060
Nitrobenzene	< 4210	< 2060
Pentachlorobenzene	< 7150	< 3500
Pentachloronitrobenzene	< 4210	< 2060
Pentachlorophenol	< 4210	< 2060
Phenacetin	< 4210	< 2060
Phenanthrene	< 4210	< 2060
Phenol	< 2520 J	< 1230
Pyrene	< 4210	< 2060
Pyridine	< 4630	< 2260
Trimethylphosphate	< 4210	< 2060
Triphenylphosphate	< 21000	< 10300
m,p-Cresol	< 6310 J	< 3080
m-Nitrotoluene	< 4210	< 2060
m-Toluidine	< 8410	< 4110
o,p-Toluidine	28400 J	< 10500
o-Cresol	< 4210	< 2060
o-Nitrotoluene	< 4210	< 2060
p-Chloroaniline	178000	< 2060
p-Dimethylaminoazobenzene	< 4210	< 2060
p-Nitrotoluene	< 6310	< 3080
Metals ($\mu\text{g/kg}$)		
Antimony	< 410	< 411
Cadmium	520 J	< 410
Chromium	7840 J	15800
Lead	3733 J	6920
Nickel	6570 J	10400
Miscellaneous ($\mu\text{g/kg}$)		
Percent Moisture	2.50%	2.7 %
Total Organic Carbon	NA	NA

B=Blank Contamination

J=Estimated Value

NA=Not Analyzed

6.0 SURFACE WATER AND SEDIMENT SAMPLING SUMMARY

The Work Plan originally proposed surface water and sediment samples only from SWMU 4: Ash Lagoon. These samples have been included as part of the RFI and the results will be evaluated for site characterization, risk assessment and CMS data needs.

In a letter dated August 23, 1996, the USEPA outlined comments to the Work Plan (ICF Kaiser, 1996). Comment #1 addressed the requirement of additional sediment and surface water samples to the Beaver Run Lagoon. A second letter from the USEPA, dated September 24, 1996, re-emphasized this position. Bayer agreed to add surface and sediment sampling upstream, midstream, and downstream of Beaver Run (in addition to the Ash Lagoon samples). The finalized sample locations for both SWMU 4 and the Beaver Run samples are illustrated on Figure 6-1.

Surface water samples were collected directly into sample bottles and analyzed for VOCs, SVOCs, selected metals (as defined in the Work Plan), TOC, TSS, TDS, nitrate, total nitrogen, pH, BOD, COD, and oil and grease. Sediment samples to be analyzed for a reduced list of analytical parameters (VOCs, SVOCs, and selected metals) were collected from the surface of the sediments (0 to 0.5 ft-bgs). Shelby tube samples were collected at selected locations for grain size distribution, hydrometer analysis, and bulk density.

Surface water and sediment sampling (RFI Task 7) was conducted in June 1997 to provide current data on potential contamination affecting the Beaver Run Creek and Lagoon as well as SWMU 4 (Ash Lagoon). This section presents the scope of work, field data observed during sampling activities, laboratory analytical results, screening-level risk assessment, and conclusions and recommendations.

6.1 SWMU 4: ASH LAGOON – SEDIMENTS

The ash lagoon was constructed in 1973 by excavating and diking the area. The ash lagoon is an unlined, irregularly shaped impoundment covering approximately one acre. It is located over the former streambed of Beaver Run Creek, immediately north of SWMU 1 (South Landfill) and east of the SWMU 2 (Sludge Lagoon). The estimated depth to the original bottom of the lagoon at the northern end of the impoundment is approximately 14 ft-bgs. The depth to the original

bottom of the lagoon in the southern section of the impoundment is estimated to be approximately 7 ft-bgs. The volume of waste in the impoundment is estimated to be approximately 9,000 yd³. The ash lagoon is covered with grasses and brush and partially filled with impounded rainwater. A soil berm separates SWMU 4 from the Beaver Run lagoon. Ash slurry from the incineration of clarifier sludge in the multiple hearth sludge furnace was discharged to the lagoon with excess water transported back to the wastewater treatment area. No ash was deposited in the lagoon after 1980.

6.1.1 RFI Scope of Work

Accelerated Phase 2 Test Borings

Bayer voluntarily conducted an accelerated Phase 2 investigation during the fall of 1996, in part, to gain a better understanding of the amount of waste contained in SWMU 4. Test boring SM004-TB06, located at the northern end of the lagoon, was advanced with a skid-mounted HSA rig to the bottom of the ash in the lagoon at a depth of 14 ft-bgs. Test boring SM004-TB05, located toward the southern end of the lagoon, was advanced by hand to the bottom of the ash in the lagoon at a depth of 7 ft-bgs. This method was used because the location of TB-05 was too saturated to support the weight of the skid-mounted HSA rig. The results of the accelerated Phase 2 borings have been incorporated in the Phase 2 scope of work. SM004-TB05, -TB06 and SD10 comprise the sampling locations within the Ash Lagoon.

Phase 2 Scope of Work – Sediments

Aquatic Systems, Inc. of Pittsburgh, PA, was subcontracted by ICF Kaiser to perform the ash lagoon sediment sampling (as well as the other sediment sampling). The sediment sample from SWMU 4 was to be collected from the center of the lagoon (Figure 6-1), however, the flat-bottomed boat used for other sediment samples could not be used to access the location because the water was too shallow. Therefore, wooden planks were placed from the edge of the standing water to the desired sample location.

Sediment samples from location SM004-SD10 were obtained using a 2-inch diameter stainless steel sampler capable of recovering a 5 ft. sample. Sample collection consisted of driving the sampler into the sediments to the desired depth, retrieving the sampler, screening the recovered material with an OVM, and collecting the sediments from the desired intervals into the sample jar. Sample depths were 0 to 1 feet and 4 to 5 feet below the top of the sediments. The samples were marked for VOC, SVOC, metals, TOC, and pH analyses.

The sediment samples were turned over to the Bayer laboratory for analysis. Table 6-1 presents the complete surface water and sediment analytical results and Figure 6-1 shows selected analytical results on a plan view map.

Shelby Tube samples for geotechnical analysis were collected from a twin boring installed beside SM004-SD10. The sample was marked for sieve and hydrometer, moisture content, and Atterberg limits analyses. All geotechnical analyses were performed by Geotechnics, Inc.

6.1.2 Field Observations – SWMU 4 Sediments

Field descriptions indicate that the material in the lagoon from 0 to 4 feet is dark red-brown silt with little to some sand and a strong effluent odor. Gray to dark gray and black silty clay with little coarse to fine sand was observed from 4 to 5 feet. With the exception of the 0 to 1 ft interval, which was described as a surface "crust", all materials were very soft.

6.1.3 Risk Assessment Results – SWMU 4 Sediments

Table 6-1 provides the complete analytical results for sediments of the Ash Lagoon area, and Figure 6-1 summarizes the analytical results on a plan view map. Table 6-2 presents a summary of all detected constituents in sediments at the Ash Lagoon, and constituents with maximum detections exceeding the screening criteria. The range of detected concentrations, detection limits, frequency of detection, USEPA risk-based screening criteria and comparisons to the screening criteria are also presented in Table 6-2.

One metal (lead), one VOC (benzene) and two SVOCs (o,p-toluidine and 2,4-toluenediamine) have maximum detected concentrations exceeding both the industrial and residential soil RBCs, while two metals (chromium and nickel) and one SVOC (m-toluidine) have maximum detected concentrations that exceed only the residential soil RBCs. Twenty organic constituents have maximum detection limits that exceed both the industrial and residential soil RBCs, while 16 organic constituents have maximum detection limits that exceed the residential soil RBCs only.

The maximum detections were also compared to available ecological sediment screening criteria (Table 6-2). Four metals (cadmium, chromium, lead, and nickel), four VOCs (benzene, chlorobenzene, toluene, and trichloroethene), and four SVOCs (1,2-dichlorobenzene, 1,4-dichlorobenzene, di-n-butyl phthalate, and phenol) have maximum detected concentrations exceeding the sediment screening values

6.1.4 Conclusions and Recommendations – SWMU 4 Sediments

The maximum detections of lead, benzene, 2,4-toluenediamine and o,p-toluidine exceed their industrial RBCs. However, the RBCs for soil are very conservative screening criteria for sediments because the potential for exposure frequency is likely to be much lower for sediments than for surface soil. Also, the maximum detections of cadmium, chromium, lead, nickel, benzene, chlorobenzene, toluene, trichloroethene, 1,2-dichlorobenzene, 1,4-dichlorobenzene, di-n-butyl phthalate, and phenol exceed the ecological screening values for sediments. SWMU 4 was included in SWMU Group A (Section 4.2), which included a human health risk assessment.

6.2 SWMU 4: ASH LAGOON - SURFACE WATER

A large portion of the ash lagoon is covered with grasses and brush and partially filled with impounded rainwater. The amount of impounded rainwater varies due to evaporation and recharge from storms. Bayer also operates a surface water extraction system which pumps excess rain water to the on-site wastewater treatment facility. The brush-covered area generally has a very low bearing capacity, making sampling efforts difficult.

6.2.1 Scope of Work - Surface Water

Aquatic Systems, Inc. of Pittsburgh, PA, performed surface water sampling. The sample was to be collected from the center of the lagoon (same location as SD10), but there was no water at the location. Therefore, the surface water sample was taken from the southwest corner of the ash lagoon, from beside the berm that separates the ash lagoon from Beaver Run lagoon. This was the only location where standing water was deep enough to collect the desired sample (see Figure 6-2).

6.2.2 Risk Assessment Results - Surface Water

6.2.2.1 Comparison to Risk-based Criteria

Table 6-3 provides the complete analytical results for surface water of the Ash Lagoon area, and Figure 6-2 summarizes the analytical results on a plan view map. Table 6-4 presents a summary of all detected constituents in surface water of the Ash Lagoon, and constituents with maximum detections exceeding the screening criteria. The range of detected concentrations, detection limits, frequency of detection, USEPA risk-based screening criteria and comparisons to the screening criteria are also presented in Table 6-4.

One VOC (benzene) and one SVOCs (m,p-cresol) have maximum detected concentrations exceeding the USEPA RBCs for tap water. Of these, only benzene has a maximum detected concentration that exceeds the human health average water quality criteria (AWQC). In addition, 61 organic constituents have maximum detection limits exceeding the tap water RBCs. While 19 VOCs and 42 SVOCs had maximum detection limits that exceed the tap water RBCs, only 8 VOCs and 11 SVOCs had maximum detection limits that exceed the human health AWQCs. However, detection limits were generally reasonable and range from 1 to 10 µg/L, while tap water RBCs and human AWQCs were less than 1 µg/L. Because the detection limits appear reasonable and are not elevated, they are unlikely to make any significant detections of these constituents.

The maximum detections were also compared to ecological screening criteria. (Table 6-4). No constituents exceed the freshwater criteria.

6.2.2.2 Site-Specific Analysis

The above results indicate that no further action is necessary for surface water of the Ash Lagoon area. The reasons for assigning this area to the NFA category include:

- While several constituents have maximum detections that exceed the tap water RBC, only one detection of benzene exceeded the human health AWQCs.
- There were no constituents with maximum detections that exceeded the AWQCs for protection of freshwater organisms.
- While a number of constituents had detection limits that exceeded the tap water RBCs or human health AWQCs, the detection limits were generally reasonable and range from 1 to 10 µg/L, while the tap water RBC and human AWQCs were less than 1 µg/L. Because the detection limits appear reasonable and are not elevated, they are unlikely to mask any significant detections of these constituents.

6.2.3 Conclusions and Recommendations - Surface Water

The human health screening criteria are based on drinking water exposure. Therefore, they are very conservative for evaluating surface water that will not be used for drinking, such as in the Ash Lagoon. While the maximum detections of benzene, bis(2-ethylhexyl)phthalate, and m,p-cresol exceed their tap water RBCs, only the maximum detection of benzene exceeds the human health AWQC, which is a surface water criterion. Therefore, there is little potential for unacceptable risks from exposure through surface water contact pathways for these constituents.

In addition, comparison of the detected surface water data to freshwater screening values based on the protection of aquatic organisms indicates that no constituents exceed these criteria. As a result, no further action is warranted for surface water of the Ash Lagoon area. USEPA concurred with the no further action decision during a May 5, 1999 telephone conference call.

6.3 BEAVER RUN CREEK AND LAGOON - SEDIMENTS

The Beaver Run creek and lagoon flow along the eastern and southern sides of the Bayer plant before discharging into the Ohio River. The lagoon surrounds the eastern and southern sides of SWMUs 1 and 4. The lagoon was formed when completion of the Hannibal Lock and Dam in the early 1970s raised the river level approximately 20 feet. The lagoon averages about 10 feet deep, becoming shallower toward the east (upstream), and also at the culvert under the railroad tracks along the river to the west.

6.3.1 Phase 2 Scope of Work - Sediments

Aquatic Systems, Inc. of Pittsburgh, PA, performed the sediment sampling in the Beaver Run lagoon. The samples were collected using a flat-bottom boat.

Nine sediment samples (SM004-SD01 through -SD09) were collected at the locations shown on Figure 6-1 (surface water samples were also collected from these locations). Samples -SD01 through -SD06, located in the lagoon, were obtained using a 2-inch diameter stainless steel sampler capable of recovering a 5 ft. sample. Sample collection consisted of driving the sampler into the sediments to the desired depth, retrieving the sampler, screening the recovered material with an OVM, and collecting the sediments from the desired intervals into the sample jar. Sample depths were 0 to 1 feet and 4 to 5 feet below the top of the sediments. Samples -SD07 through -SD09, located in the stream, were obtained using a hand trowel. Sample depths were 0 to 1 feet below the top of the sediments. All sediment samples were marked for VOC, SVOC, metals, TOC, and pH analyses. Sediment samples were turned over to the Bayer laboratory for analysis. Table 6-5 presents the complete sediment analytical results and Figure 6-1 provides selected analytical results on a plan view map.

Shelby Tube samples for geotechnical analysis were collected from twin borings installed beside sediment sample locations SM004-SD01 through SM004-SD06. The samples were marked for sieve and hydrometer, moisture content, and Atterberg limits analyses. All geotechnical analyses were performed by Geotechnics, Inc.

Due to missed holding times, it was necessary to resample six sediment locations and reanalyze them for SVOCs. These samples were designated with an "RS" in Table 6-5. Resampling at sediment locations SM004-SD01, -SD02, and -SD04 through -SD07 was performed in late February 1998. Aquatic Systems used the same sampling methods as before. The recollected samples were submitted to the Bayer laboratory and analyzed for the complete list of SVOCs.

6.3.2 Field Observations - Sediments

Field descriptions indicate that the sediments on the bottom of the lagoon average 3.5 to 4 feet of black to gray-black, highly organic silt with a little sand and few shells. Black to dark gray silt was observed in SM004-SD01 from 4 to 5 feet. In samples from SM004-SD02 through SM004-SD06, red-brown clay with little sand was observed from 4 to 5 feet. With the exception of the 3.5 to 4.5 intervals in SM004-SD02, which was stiff clay, all samples were described as soft to very soft with a high liquid content. Samples SM004-SD07 through SM004-SD09 were brown, coarse to fine, angular gravel with little sand and silt.

6.3.3 Risk Assessment Results - Sediments

6.3.3.1 Comparison to Risk-based Criteria

Table 6-5 provides the complete analytical results for sediments at Beaver Run Lagoon area, and Figure 6-1 summarizes the analytical results on a plan view map. Table 6-6 presents a summary of all detected constituents in sediments of the Beaver Run Lagoon, and constituents with maximum detections exceeding the screening criteria. The range of detected concentrations, detection limits, frequency of detection, USEPA risk-based screening criteria and comparisons to the screening criteria are also presented in Table 6-6.

No constituents have maximum detected concentrations exceeding either the industrial or residential soil RBCs. Twelve organic constituents have maximum detection limits that exceed both the industrial and residential soil RBCs, while twelve organic constituents have maximum detection limits that exceed the residential soil RBCs only. However, detection limits were acceptable and range from 0.34 to 3.44 mg/kg, while the exceeded RBCs are all less than 0.50 mg/kg. Therefore, these detection limits are reasonable, are not elevated, and are unlikely to mask significant concentrations of constituents of interest.

The maximum detections were also compared to ecological screening criterion (Table 6-6). Four metals (cadmium, chromium lead, and nickel), one VOC (chlorobenzene), and two SVOCs (1,2-dichlorobenzene and di-n-butyl phthalate) have maximum detected concentrations exceeding the sediment screening values.

6.3.3.2 Site-Specific Analysis

The above results indicate that no further action is necessary for sediments of the Beaver Run Lagoon area. The reasons for assigning this area to the NFA category include:

- There were no constituents with maximum detections that exceeded either the industrial or residential RBCs.
- While some constituents have maximum detection limits that exceed the RBCs, the detection limits for these constituents range only from 0.34 to 3.44 mg/kg, while the exceeded RBCs are all less than 0.50 mg/kg. Therefore, these detection limits are reasonable, are not elevated, and are unlikely to mask significant concentrations of constituents of interest.
- While some constituents exceed sediment-screening values for protection of aquatic organisms, di-n-butyl phthalate is a blank contaminant; the other organic constituents exceed the screening values in only one or two samples.

6.3.4 Conclusions and Recommendations - Sediments

No constituents have maximum detections that exceed the industrial or residential soil RBCs, which are very conservative screening criteria for direct contact with sediments. Therefore, there is little potential for unacceptable risks from exposure through sediment contact pathways for these constituents. No further action is warranted for sediments of the Beaver Run Lagoon area. During a May 5, 1999 telephone conference call, USEPA concurred with the further action decision for sediments in Beaver Run Creek and Lagoon.

6.4 BEAVER RUN CREEK AND LAGOON - SURFACE WATER

6.4.1 RFI Scope of Work - Surface Water

Aquatic Systems, Inc. of Pittsburgh, PA, performed the surface water sampling in the Beaver Run lagoon. The samples were collected using a flat-bottom boat. Surface water sampling was conducted in conjunction with the sediment sampling, and preceded from downstream to upstream so as not to cloud the water with disturbed sediments.

Nine surface water samples (SM004-SW01 through -SW09) were collected downstream, midstream, and upstream at the locations illustrated in Figure 6-2. The water was collected directly into the appropriate sample containers. The samples were marked for VOC, SVOC, TOC and metals analyses.

Surface water samples were turned over to the Bayer laboratory for analysis. Table 6-7 presents the complete surface water and sediment analytical results and Figure 6-2 provides selected analytical results on a plan view map. Due to missed holding times, it was necessary to resample one surface water location and analyze the sample for SVOCs. Sample SM004-SW06 designated with an "RS" to denote that it was resampled in Table 6-7. The resampling effort was performed in late February 1998.

6.4.2 Risk Assessment Results - Surface Water

6.4.2.1 Comparison to Risk-based Criteria

Table 6-7 provides the complete analytical results for surface water of the Beaver Run Lagoon area, and Figure 6-2 summarizes the analytical results on a plan view map. Table 6-8 presents a summary of all detected constituents in surface water of the Beaver Run Lagoon, and constituents with maximum detections exceeding the screening criteria. The range of detected concentrations, detection limits, frequency of detection, USEPA risk-based screening criteria and comparisons to the screening criteria are also presented in Table 6-8.

Only one SVOC (bis (2-ethylhexyl)phthalate) has a maximum detected concentration exceeding the USEPA RBCs for tap water, and no constituents exceed the human health AWQCs. While 19 VOCs and 34 SVOCs have maximum detection limits that exceed the tap water RBCs, only 8 VOCs and 9 SVOCs have maximum detection limits that exceed the human health AWQCs,

screening criteria for surface water. However, detection limits were generally acceptable and range from 1 to 2 µg/L, while tap water RBCs and human AWQCs were less than 1 µg/L. Because detection limits appear reasonable and are not elevated, they are unlikely to mask any significant detection of these constituents.

The maximum detections were also compared to ecological screening criteria. (Table 6-8) No constituents have maximum detections that exceed the freshwater criteria.

6.4.2.2 Site-Specific Analysis

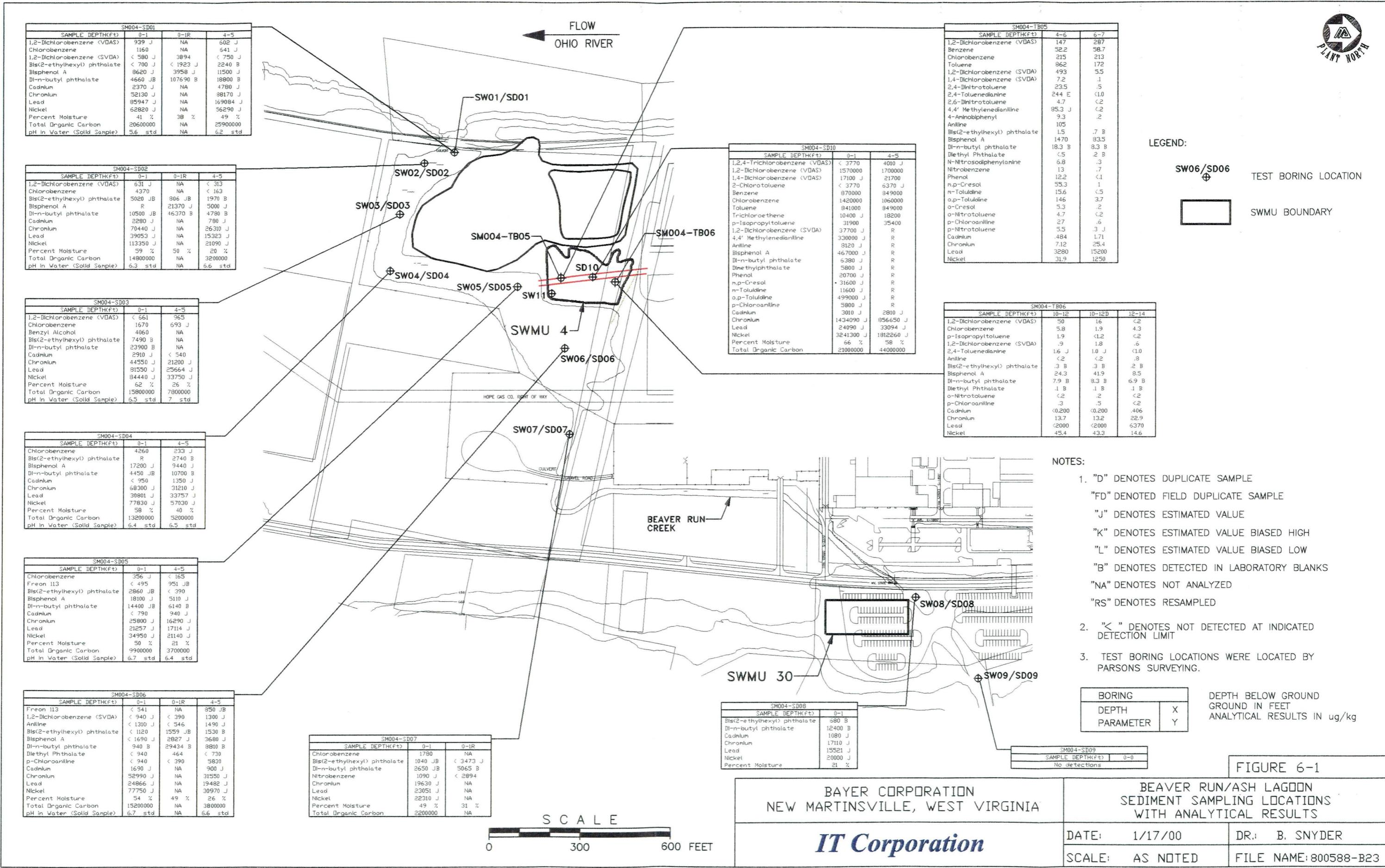
The above results indicate that no further action is necessary for surface water of the Beaver Run Lagoon area. The reasons for assigning this area to the NFA category include:

- Only one SVOC (bis (2-ethylhexyl)phthalate), which is a common laboratory contaminant, had a maximum detection that exceeded the tap water RBCs. All other detections of bis (2-ethylhexyl) phthalate and the detection limits for all but one of the nondetections were less than the tap water RBC.
- There were no constituents with maximum detections that exceeded the human health AWQCs.
- There were no constituents with maximum detections that exceeded the AWQCs for protection of freshwater organisms.
- While a number of constituents had detection limits that exceeded the tap water RBCs or human health AWQCs, the detection limits were generally reasonable and range from 1 to 2 µg/L, while the tap water RBC and human AWQC were less than 1 µg/L. Because the detection limits appear reasonable and are not elevated, they are unlikely to mask any significant detection of these constituents.

6.4.3 Conclusions and Recommendations - Surface Water

The human health screening criteria are based on drinking water exposure. Therefore, they are very conservative for evaluating surface water that will not be used for drinking, such as in the Beaver Run Lagoon. Only the maximum detection of bis (2-ethylhexyl)phthalate exceeds its tap water RBC, while no constituents have maximum detections that exceed the human health AWQC. Therefore, there is little potential for unacceptable risks from exposure through surface water contact pathways for these constituents. In addition, comparison of the surface water data to freshwater screening values based on the protection of aquatic organisms indicates that no constituents exceed these criteria. As a result, no further action is warranted for surface water of

the Beaver Run Lagoon area. USEPA concurred with the no further action decision during a May 5, 1999 telephone conference call.



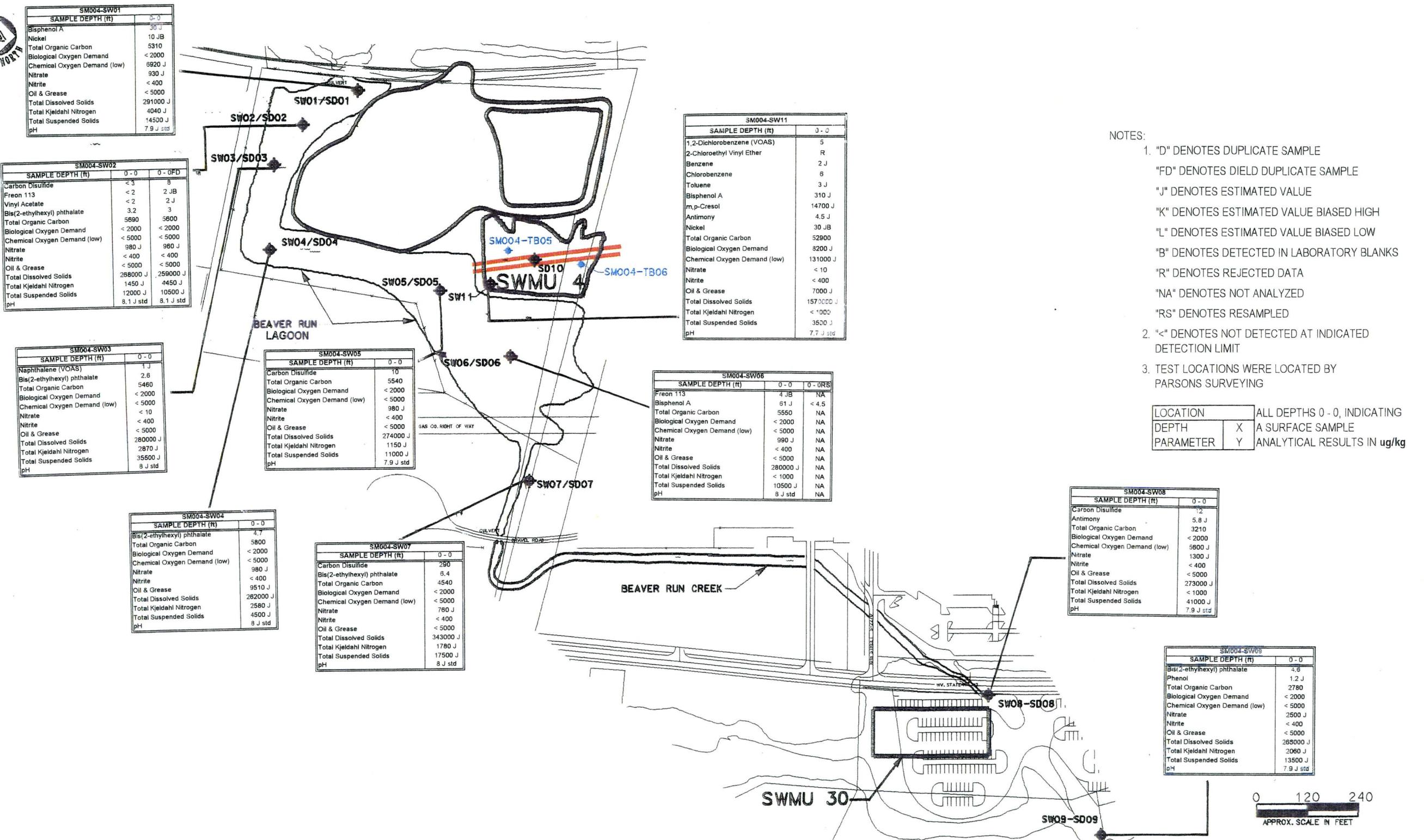


FIGURE 6-2

BAYER CORPORATION NEW MARTINSVILLE, WEST VIRGINIA		BEAVER RUN/ASH LAGOON SURFACE WATER SAMPLING LOCATIONS WITH ANALYTICAL RESULTS	
<i>IT Corporation</i>		DATE: 1/17/00	DR.: B. SNYDER
SCALE: AS NOTED		FILE NAME: 800588-B22	

TABLE 6-1
Sediment Analytical Results for SWMU 4: Ash Lagoon

SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE	SM004-TB05-0406 4.0-6.0 TB05 10/30/1996 (mg/kg)	SM004-TB05-0607 6.0-7.0 TB05 10/30/1996 (mg/kg)	SM004-TB06-1012 10.0-12.0 TB06 10/29/1996 (mg/kg)	SM004-TB06-1012D 10.0-12.0 TB06 10/29/1996 (mg/kg)	SM004-TB06-1214 12.0-14.0 TB06 10/29/1996 (mg/kg)	SM004-SD10-0001 0.00-1.00 SD10 6/18/1997 (µg/kg)	SM004-SD10-0405 4.00-5.00 SD10 6/18/1997 (µg/kg)
Volatiles							
1,1,1,2-Tetrachloroethane	<24.0	<24.0	<1.2	<1.2	<.2	< 7250	< 5900
1,1,1-Trichloroethane	<36.0	<36.0	<1.8	<1.8	<.2	< 3770	< 3070
1,1,2,2-Tetrachloroethane	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
1,1,2-Trichloroethane	<24.0	<24.0	<1.2	<1.2	<.2	< 7250	< 5900
1,1-Dichloroethane	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
1,1-Dichloroethene	<24.0	<24.0	<1.2	<1.2	<1.2	< 7250	< 5900
1,1-Dichloropropene	<36.0	<36.0	<1.8	<1.8	<.4	< 3770	< 3070
1,2,3-Trichlorobenzene (VOAS)	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
1,2,3-Trichloropropane	<36.0	<36.0	<1.8	<1.8	<.4	< 3770	< 3070
1,2,4-Trichlorobenzene (VOAS)	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	4010 J
1,2,4-Trimethylbenzene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
1,2-Dibromo-3-chloropropane	<120.0	<120.0	<6.0	<6.0	<1.2	< 7250	< 5900
1,2-Dibromoethane	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
1,2-Dichlorobenzene (VOAS)	147	287	50	16	<.2	1570000	1700000
1,2-Dichloroethane	<24.0	<24.0	<1.2	<1.2	<.2	< 7250	< 5900
1,2-Dichloropropane	<24.0	<24.0	<1.2	<1.2	<.2	< 11000	< 8960
1,3,5-Trimethylbenzene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
1,3-Dichlorobenzene (VOAS)	<24.0	<24.0	<1.2	<1.2	<.2	< 7250	< 5900
1,3-Dichloropropane	<12.0	<12.0	<.6	<.6	<1.1	< 3770	< 3070
1,4-Dichlorobenzene (VOAS)	<24.0	<24.0	<1.2	<1.2	<.2	17100 J	21700
2,2-Dichloropropane	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
2-Butanone (MEK)	<120.0	<120.0	<6.0	<6.0	<1.2	< 25500	< 20800
2-Chloroethyl Vinyl Ether	<36.0	<36.0	<1.8	<1.8	<.4	< 7250	< 5900
2-Chlorotoluene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	6370 J
2-Hexanone	<120.0	<120.0	<6.0	<6.0	<1.2	< 11000	< 8960
4-Chlorotoluene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
4-Methyl-2-pentanone (MIK)	<120.0	<120.0	<6.0	<6.0	<.2	< 11000	< 8960
Acetone	<120.0	<120.0	<6.0	<6.0	<1.2	< 25500	< 20800
Acrolein	<120.0	<120.0	<6.0	<6.0	<1.2	< 72500	< 59000
Acrylonitrile	<120.0	<120.0	<6.0	<6.0	<1.2	< 37700	< 30700
Allyl Chloride (3-Chloro-1-propene)	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
Benzene	52.2	58.7	<1.8	<1.8	<.4	870000	849000
Bromobenzene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
Bromochloromethane	<36.0	<36.0	<1.8	<1.2	<.4	< 3770	< 3070
Bromodichloromethane	<24.0	<24.0	<1.2	<1.8	<.2	< 7250	< 5900
Bromoform	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
Bromomethane	<24.0	<24.0	<1.2	<1.2	<.2	< 11000	< 8960
Carbon Disulfide	<24.0	<24.0	<1.2	<1.2	<.2	< 11000	< 8960
Carbon Tetrachloride	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
Chlorobenzene	215	213	5.8	1.9	4.3	1420000	1060000
Chloroethane	<24.0	<24.0	<1.2	<1.2	<.2	< 11000	< 8960
Chloroform	<12.0	<12.0	<.6	<.6	<1.1	< 3770	< 3070
Chloromethane	<36.0	<36.0	<1.8	<1.8	<.4	< 7250	< 5900
Dibromochloromethane	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
Dibromomethane	<36.0	<36.0	<1.8	<1.8	<.4	< 3770	< 3070
Dichlorodifluoromethane	<24.0	<24.0	<1.2	<1.2	<.2	< 7250	< 5900
Ethyl Methacrylate	<36.0	<36.0	<1.8	<1.8	<.4	< 3770	< 3070
Ethylbenzene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
Freon 113						< 7250	< 5900
Freon 141b						< 3770	< 3070
Hexachlorobutadiene (VOAS)	<24.0	<24.0	<1.2	<1.2	<.2	< 7250	< 5900
Isopropylbenzene	<24.0	<24.0	<1.2	<1.2	<.2	< 11000	< 8960
Methyl Iodide (Iodomethane)	<24.0	<24.0	<1.2	<1.2	<.2	< 11000	< 8960
Methylene Chloride	<31.2	<31.2	<1.6	<1.6	<3	< 7250	< 5900
Naphthalene (VOAS)	<120.0	<120.0	<6.0	<6.0	<1.2	< 3770	< 3070
Styrene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
Tetrachloroethene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
Toluene	862	172	<1.2	<1.2	<.2	841000	849000
Trichloroethene	<12.0	<12.0	<.6	<.6	<.1	10400 J	18200
Trichlorofluoromethane	<24.0	<24.0	<1.2	<1.2	<.2	< 7250	< 5900
Vinyl Acetate	<120.0	<120.0	<6.0	<6.0	<1.2	< 11000	< 8960
Vinyl Chloride	<24.0	<24.0	<1.2	<1.2	<.2	< 7250	< 5900
cis-1,2-Dichloroethene	<24.0	<24.0	<1.2	<1.2	<.2	< 7250	< 5900
cis-1,3-Dichloropropene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
m+p-Xylene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
n-Butylbenzene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070

TABLE 6-1
Sediment Analytical Results for SWMU 4: Ash Lagoon

SAMPLE ID	SM004-TB05-0406	SM004-TB05-0607	SM004-TB06-1012	SM004-TB06-1012D	SM004-TB06-1214	SM004-SD10-0001	SM004-SD10-0405
SAMPLE LOCATION	4.0-6.0 TB05	6.0-7.0 TB05	10.0-12.0 TB06	10.0-12.0 TB06	12.0-14.0 TB06	0.00-1.00 SD10	4.00-5.00 SD10
SAMPLE DATE	10/30/1996 (mg/kg)	10/30/1996 (mg/kg)	10/29/1996 (mg/kg)	10/29/1996 (mg/kg)	10/29/1996 (mg/kg)	6/18/1997 (μ g/kg)	6/18/1997 (μ g/kg)
n-Propylbenzene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
o-Xylene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
p-Isopropyltoluene	<24.0	<24.0	1.9	<1.2	<.2	31900	35400
sec-Butylbenzene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
tert-Butylbenzene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
trans-1,2-Dichloroethene	<12.0	<12.0	<.6	<.6	<.1	< 7250	< 5900
trans-1,3-Dichloropropene	<24.0	<24.0	<1.2	<1.2	<.2	< 3770	< 3070
trans-1,4-Dichloro-2-butene	<120.0	<120.0	<6.0	<6.0	<1.2	< 37700	< 30700
Semivolatiles							
1,2,3-Trichlorobenzene (SVOA)	<1.0	<.2	<.2	<.2	<.2	< 6960 J	R
1,2,4,5-Tetrachlorobenzene	<1.0	<.2	<.2	<.2	<.2	< 6960 J	R
1,2,4-Trichlorobenzene (SVOA)	<1.0	<.2	<.2	<.2	<.2	< 5800 J	R
1,2-Dichlorobenzene (SVOA)	493	5.5	0.9	1.8	0.6	37700 J	R
1,3-Dichlorobenzene (SVOA)	<.8	<.2	<.2	<.2	<.2	< 5800 J	R
1,4-Dichlorobenzene (SVOA)	7.2	0.1	<.1	<.1	<.1	< 5800 J	R
1-Chloronaphthalene	<2.5	<.5	<.5	<.5	<.5	< 14500 J	R
1-Methylnaphthalene	<1.0	<.2	<.2	<.2	<.2	< 5800 J	R
1-Naphthylamine	<1.0	<.2	<.2	<.2	<.2	< 19700 J	R
2,3,4,6-Tetrachlorophenol	<1.0	<1.0	<.2	<.2	<.2	R	R
2,3-Dichloroaniline	<1.0	<.2	<.2	<.2	<.2	< 5800 J	R
2,4,5-Trichlorophenol	<1.0	<.2	<.2	<.2	<.2	R	R
2,4,6-Trichlorophenol	<.5	<.1	<.1	<.1	<.1	R	R
2,4-Dichlorophenol	<3	<.1	<.1	<.1	<.1	R	R
2,4-Dimethylphenol	<.9	<.2	<.2	<.2	<.2	R	R
2,4-Dinitrophenol	<16.0	<3.2	<3.2	<3.2	<3.2	R	R
2,4-Dinitrotoluene	23.5	0.5	<.2	<.2	<.2	< 5800 J	R
2,4-Toluenediamine	244 E	<1.0	1.6 J	1.0 J	<1.0	< 154000 J	R
2,6-Dichlorophenol	<.8	<.2	<.2	<.2	<.2	R	R
2,6-Dinitrotoluene	4.7	<.2	<.2	<.2	<.2	< 5800 J	R
2-Chloronaphthalene	<1.0	<.2	<.2	<.2	<.2	< 5800 J	R
2-Chlorophenol	<.8	<.2	<.2	<.2	<.2	R	R
2-Methylnaphthalene	<1.0	<.2	<.2	<.2	<.2	< 5800 J	R
2-Naphthylamine	<1.0	<.2	<.2	<.2	<.2	< 22000 J	R
2-Nitroaniline	<1.0	<.2	<.2	<.2	<.2	< 6960 J	R
2-Nitrodiphenylamine	<1.0	<.2	<.2	<.2	<.2	< 5800 J	R
2-Nitrophenol	<1.0	<.2	<.2	<.2	<.2	R	R
2-Picoline	<1.0	<.2	<.2	<.2	<.2	< 21500 J	R
3,3'-Dichlorobenzidine	<.5	<.1	<.1	<.1	<.1	< 35400 J	R
3-Methylcholanthrene	<1.0	<.2	<.2	<.2	<.2	< 5800 J	R
3-Nitroaniline	<.5	<.1	<.1	<.1	<.1	< 5800 J	R
4,4' Methyleneedianiline	85.3 J	<.2	<.2	<.2	<.2	330000 J	R
4,6-Dinitro-o-cresol	<1.0	<.2	<.2	<.2	<.2	R	R
4-Aminobiphenyl	9.3	0.2	<.2	<.2	<.2	< 5800 J	R
4-Aminodiphenylamine	<1.0	<.2	<.2	<.2	<.2	< 14500 J	R
4-Bromophenyl phenyl ether	<.8	<.2	<.2	<.2	<.2	< 5800 J	R
4-Chloro-m-cresol	<1.0	<.2	<.2	<.2	<.2	R	R
4-Chlorophenylphenyl ether	<.5	<.1	<.1	<.1	<.1	< 5800 J	R
4-Nitroaniline	<1.0	<.2	<.2	<.2	<.2	< 5800 J	R
4-Nitrophenol	<.9	<.2	<.2	<.2	<.2	R	R
5-Nitro-o-toluidine	<1.0	<.2	<.2	<.2	<.2	< 5800 J	R
7,12-dimethylbenz[a]anthracene	<1.0	<.2	<.2	<.2	<.2	< 5800 J	R
Acenaphthene	<.5	<.1	<.1	<.1	<.1	< 5800 J	R
Acenaphthylene	<.5	<.1	<.1	<.1	<.1	< 5800 J	R
Acetophenone	<1.0	<.2	<.2	<.2	<.2	< 7540 J	R
Aniline	105		<.2	<.2	.8	8120 J	R
Anthracene	<.5	<.1	<.1	<.1	<.1	< 5800 J	R
Azobenzene	<1.0	<.2	<.2	<.2	<.2	< 6960 J	R
Benzidine	<16.0	<3.2	<3.2	<3.2	<3.2	< 92800 J	R
Benz(a)anthracene	<1.0	<.2	<.2	<.2	<.2	< 7540 J	R
Benz(a)pyrene	<.5	<.1	<.1	<.1	<.1	< 5800 J	R
Benz(b)fluoranthene	<.5	<.1	<.1	<.1	<.1	< 5800 J	R
Benz(ghi)perylene	<1.0	<.2	<.2	<.2	<.2	< 6380 J	R
Benz(k)fluoranthene	<1.0	<.2	<.2	<.2	<.2	< 5800 J	R

TABLE 6-1
Sediment Analytical Results for SWMU 4: Ash Lagoon

SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE	SM004-TB05-0406 4.0-6.0 TB05 10/30/1996 (mg/kg)	SM004-TB05-0607 6.0-7.0 TB05 10/30/1996 (mg/kg)	SM004-TB06-1012 10.0-12.0 TB06 10/29/1996 (mg/kg)	SM004-TB06-1012D 10.0-12.0 TB06 10/29/1996 (mg/kg)	SM004-TB06-1214 12.0-14.0 TB06 10/29/1996 (mg/kg)	SM004-SD10-0001 0.00-1.00 SD10 6/18/1997 (µg/kg)	SM004-SD10-0405 4.00-5.00 SD10 6/18/1997 (µg/kg)
Benzoic Acid	<1.0	<2	<2	<2	<2	R	R
Benzyl Alcohol	<.5	<.1	<.1	<.1	<.1	R	R
Benzyl butyl phthalate	<1.0	<2	<2	<2	<2	<5800 J	R
Bis(2-chloroethoxy)methane	<1.0	<2	<2	<2	<2	<5800 J	R
Bis(2-chloroethyl)ether	<.8	<2	<2	<2	<2	<5800 J	R
Bis(2-chloroisopropyl)ether	<1.0	<2	<2	<2	<2	<5800 J	R
Bis(2-ethylhexyl) phthalate	1.5	.7 B	.3 B	.3 B	.2 B	<6960 J	R
Bisphenol A	1470	83.5	24.3	41.9	8.5	467000 J	R
Carbazole						<29000 J	R
Chrysene	<1.0	<2	<2	<2	<2	<5800 J	R
Cyclohexanone	<1.0	<2	<2	<2	<2	<5800 J	R
Di-n-butyl phthalate	18.3 B	8.3 B	7.9 B	8.3 B	6.9 B	6380 J	R
Di-n-octyl phthalate	<.5	<.1	<.1	<.1	<.1	<5800 J	R
Dibenz(a,h)anthracene	<.8	<2	<2	<2	<2	<5800 J	R
Dibenzofuran	<1.0	<2	<2	<2	<2	<5800 J	R
Diethyl Phthalate	<.5	.2 B	.1 B	.1 B	.1 B	<5800 J	R
Dimethylphthalate	<.5	<.1	<.1	<.1	<.1	5800 J	R
Ethyl Methane Sulfonate	<2.5	<.5	<.5	<.5	<.5	<10400 J	R
Fluoranthene	<1.0	<2	<2	<2	<2	<5800 J	R
Fluorene	<.5	<1	<1	<1	<1	<5800 J	R
Heptachlor						<6380 J	R
Hexachlorobenzene	<.8	<2	<2	<2	<2	<5800 J	R
Hexachlorobutadiene (SVOA)	<.5	<.1	<.1	<.1	<.1	<5800 J	R
Hexachlorocyclopentadiene	<1.0	<2	<2	<2	<2	<5800 J	R
Hexachloroethane	<.8	<2	<2	<2	<2	<5800 J	R
Indeno(1,2,3-cd)pyrene	<1.0	<2	<2	<2	<2	<5800 J	R
Iso phorone	<1.0	<2	<2	<2	<2	<5800 J	R
Methyl methane sulfonate	<1.0	<2	<2	<2	<2	<5800 J	R
N-Nitrosodibutylamine	<1.0	<2	<2	<2	<2	<5800 J	R
N-Nitrosodimethylamine	<1.0	<2	<2	<2	<2	<5800 J	R
N-Nitrosodiphenylamine	6.8	0.3	<2	<2	<2	<7540 J	R
N-Nitrosodipropylamine	<.8	<2	<2	<2	<2	<5800 J	R
N-Nitroso piperidine	<1.0	<2	<2	<2	<2	<5800 J	R
Naphthalene (SVOA)	<.8	<2	<2	<2	<2	<5800 J	R
Nitrobenzene	13	0.7	<.1	<.1	<.1	<5800 J	R
Pentachlorobenzene	<1.0	<2	<2	<2	<2	<9860 J	R
Pentachloronitrobenzene	<1.0	<2	<2	<2	<2	<5800 J	R
Pentachlorophenol	<.4	<.1	<.1	<.1	<.1	R	R
Phenacetin	<1.0	<2	<2	<2	<2	<5800 J	R
Phenanthrene	<1.0	<2	<2	<2	<2	<5800 J	R
Phenol	12.2	<.1	<.1	<.1	<.1	20700 J	R
Pyrene	<.5	<.1	<.1	<.1	<.1	<5800 J	R
Pyridine	<1.0	<2	<2	<2	<2	<6380 J	R
Trimethylphosphate	<1.0	<2	<2	<2	<2	<5800 J	R
Triphenylphosphate						<29000 J	R
m,p-Cresol	55.3	1	<.5	<.5	<.5	31600 J	R
m-Nitrotoluene	<1.0	<2	<2	<2	<2	<5800 J	R
m-Toluidine	15.6	<.5	<.5	<.5	<.5	11600 J	R
o,p-Toluidine	146	3.7	<.5	<.5	<.5	499000 J	R
o-Cresol	5.3	0.2	<2	<2	<2	R	R
o-Nitrotoluene	4.7	<2	<2	0.2	<2	<5800 J	R
p-Chloroaniline	27	0.6	0.3	0.5	<2	5800 J	R
p-Dimethylaminoazobenzene	<1.0	<2	<2	<2	<2	<5800 J	R
p-Nitrotoluene	5.5	.3 J	<2	<2	<2	<8700 J	R
Metals							
Antimony (mg/Kg)	<0.100	<0.100	<0.100	<0.100	<0.100	<1159	<943
Cadmium (mg/Kg)	0.484	1.71	<0.200	<0.200	0.406	3010 J	2810 J
Chromium (mg/Kg)	7.12	25.4	13.7	13.2	22.9	1434090 J	856650 J
Lead (µg/kg)	3280	15200	<2000	<2000	6370	24090 J	33094 J
Nickel (mg/Kg)	31.9	1250	45.4	43.3	14.6	3241300 J	1812260 J
Miscellaneous (µg/kg)							
Percent Moisture	48.5	20.7	53.2	52.5	23.6	66 %	58 %
Total Organic Carbon	NA	NA	NA	NA	NA	21000000	44000000
pH in Water (Solid Sample)	NA	NA	NA	NA	NA	NA	NA

B=Blank Contamination

J=Estimated Value

NA=Not Analyzed

R=Data Rejected for Quality Reasons

TABLE 6-2
Comparison to Risk-Based Criteria
SWMU 4: Ash Lagoon -- Sediments

Constituent	Maximum Detected Concentration (mg/kg) ⁽¹⁾	Maximum Detection Limit for Non-Detects (mg/kg)	Frequency of Detection	EPA Region III Risk-Based Concentrations for Soil (mg/kg)		Ecological SQC (mg/kg)	Maximum Detection Exceeds Criteria	Maximum Detection Limit for Non-Detects Exceeds Criteria
				Industrial	Residential			
MISCELLANEOUS								
Total Organic Carbon	44000	NA	3 / 3	--	--	--	No	No
METALS								
Cadmium	3.01 J	< 0.20	7 / 9	1000	39	1.2 ²	ECO	No
Chromium	1434 J	NA	9 / 9	10000	390	81 ²	> RES, ECO	No
Lead	15200	NA	9 / 9	400	200	47 ²	> IND, RES, ECO	No
Nickel	3241 J	NA	9 / 9	41000	1600	21 ²	> RES, ECO	No
VOLATILES								
1,1,1-Trichloroethane	ND	< 36.0	0 / 9	41000	1600	0.17 ³	No	> ECO
1,1,2,2-Tetrachloroethane	ND	< 24.0	0 / 9	29	3.2	0.94 ³	No	> RES, ECO
1,1,2-Trichloroethane	ND	< 24.0	0 / 9	100	11	1.2 ³	No	> RES, ECO
1,1-Dichloroethane	ND	< 24.0	0 / 9	200000	7800	No	No	No
1,1-Dichloroethene	ND	< 24.0	0 / 9	9.5	1.1	0.031 ⁴	No	> IND, RES, ECO
1,2,3-Trichloropropane	ND	< 36.0	0 / 9	0.82	0.091	--	No	> IND, RES
1,2-Dibromo-3-chloropropane	ND	< 120	0 / 9	4.1	0.46	--	No	> IND, RES
1,2-Dibromoethane	ND	< 24.0	0 / 9	0.067	0.0075	--	No	> IND, RES
1,2-Dichloroethane	ND	< 24.0	0 / 9	63	7	0.26 ⁴	No	> RES
1,2-Dichloropropane	ND	< 24.0	0 / 9	84	9.4	--	No	> RES
2-Chlorotoluene	6.37 J	< 24.0	1 / 9	41000	1600	--	No	No
Acetone	ND	< 120	0 / 9	200000	7800	0.0088 ⁴	No	> ECO
Acrylonitrile	ND	< 120	0 / 9	11	1.2	--	No	> IND, RES
Benzene	870	< 1.80	4 / 9	200	22	0.057 ³	> IND, RES, ECO	> ECO
Bromodichloromethane	ND	< 24.0	0 / 9	92	10	--	No	> RES
Bromoform	ND	< 24.0	0 / 9	720	81	--	No	No
Bromomethane	ND	< 24.0	0 / 9	2900	110	--	No	No
Carbon Tetrachloride	ND	< 24.0	0 / 9	44	4.9	0.048 ⁴	No	> RES, ECO
Chlorobenzene	1420	< 0.158	8 / 9	41000	1600	0.82 ³	> ECO	No
Chloroform	ND	< 12.0	0 / 9	940	100	0.099 ⁴	No	> ECO
cis-1,2-Dichloroethene	ND	< 24.0	0 / 9	20000	780	0.40 ⁴	No	> ECO
cis-1,3-Dichloropropene	ND	< 24.0	0 / 9	33	3.7	0.051 ⁴	No	> RES, ECO
Dibromochloromethane	ND	< 24.0	0 / 9	68	7.6	--	No	> RES
Ethylbenzene	ND	< 24.0	0 / 9	200000	7800	3.8 ³	No	> ECO
Methylene Chloride	ND	< 31.2	0 / 9	760	85	0.38 ⁴	No	> ECO
p-Isopropyltoluene	35.4	< 24.0	3 / 9	--	--	--	No	No
Styrene	ND	< 24.0	0 / 9	410000	16000	--	No	No
Tetrachloroethene	ND	< 24.0	0 / 9	110	12	0.53 ³	No	> RES, ECO
Toluene	862	< 1.20	4 / 9	410000	16000	0.67 ³	> ECO	> ECO
trans-1,2-Dichloroethene	ND	< 12.0	0 / 9	41000	1600	0.40 ⁴	No	> ECO
trans-1,3-Dichloropropene	ND	< 24.0	0 / 9	33	3.7	0.051 ⁴	No	> RES, ECO
Trichloroethene	18.2	< 12.0	2 / 9	520	58	1.6 ³	> ECO	> ECO
Trichlorofluoromethane	ND	< 24.0	0 / 9	610000	23000	--	No	No
SEMOVATILES								
Vinyl Chloride	ND	< 24.0	0 / 9	3	0.34	--	No	> IND, RES
1,2,3-Trichlorobenzene	ND	< 6.96	0 / 8	20000	780	9.2 ³	No	No
1,2,4-Trichlorobenzene	ND	< 5.80	0 / 8	20000	780	9.2 ³	No	No
1,2-Dichlorobenzene	1700 J	< 0.200	8 / 9	180000	7000	0.34 ³	> ECO	No
1,4-Dichlorobenzene	21.7 J	< 24.0	2 / 9	240	27	0.35 ³	> ECO	> ECO
1-Naphthylamine	ND	< 19.7	0 / 9	0.044	0.0049	--	No	> IND, RES
2,4,6-Trichlorophenol	ND	< 0.500	0 / 7	520	58	--	No	No
2,4-Dinitrophenol	ND	< 16.0	0 / 7	4100	160	--	No	No
2,4-Dinitrotoluene	23.5	< 5.80	2 / 8	4100	160	--	No	No
2,4-Toluenediamine	244	< 154	3 / 8	1.8	0.2	--	> IND, RES	> IND, RES
2,6-Dinitrotoluene	4.78	< 5.80	2 / 8	2000	78	--	No	No
2-Naphthylamine	ND	< 22.0	0 / 8	0.044	0.0049	--	No	> IND, RES
2-Nitroaniline	ND	< 6.96	0 / 8	120	4.7	--	No	> RES
3,3'-Dichlorobenzidine	ND	< 35.4	0 / 8	13	1.4	--	No	> IND, RES
4,4' Methyleneedianiline	330 J	< 6.85	2 / 8	--	--	--	No	No
4-Aminobiphenyl	9.3	< 5.80	1 / 8	--	--	--	No	No
Aniline	105	< 0.800	3 / 7	1000	110	--	No	No
Azobenzene	ND	< 6.96	0 / 8	52	5.8	--	No	> RES

TABLE 6-2
Comparison to Risk-Based Criteria
SWMU 4: Ash Lagoon — Sediments

Constituent	Maximum Detected Concentration (mg/kg) ⁽¹⁾	Maximum Detection Limit for Non-Detects (mg/kg)	Frequency of Detection	EPA Region III Risk-Based Concentrations for Soil (mg/kg)		Ecological SQC (mg/kg)	Maximum Detection Exceeds Criteria	Maximum Detection Limit for Non-Detects Exceeds Criteria
				Industrial	Residential			
Benzidine	ND	< 92.8	0 / 8	0.025	0.0028	0.0017 ⁴	No	> IND, RES, ECO
Benzo(a)anthracene	ND	< 7.54	0 / 8	7.8	0.88	0.11 ⁴	No	> RES, ECO
Benzo(a)pyrene	ND	< 5.80	0 / 8	0.78	0.088	0.43 ²	No	> IND, RES, ECO
Benzo(b)fluoranthene	ND	< 5.80	0 / 8	7.8	0.88	—	No	> RES
Bis(2-chloroethyl)ether	ND	< 5.8	0 / 8	5.2	0.58	—	No	> IND, RES
Bis(2-ethylhexyl) phthalate	1.50	< 6.96	7 / 8	410	46	890 ⁴	No	No
Bisphenol A	1470	NA	8 / 8	100000	3900	—	No	No
Carbazole	ND	< 29.0	0 / 3	290	32	—	No	No
Di-n-butyl phthalate	18.3 B	NA	8 / 8	200000	7800	12 ⁴	> ECO	No
Di-n-octyl phthalate	0.52	< 5.8	1 / 8	41000	1600	—	No	No
Dibenzo(a,h)anthracene	ND	< 5.8	0 / 8	0.78	0.088	—	No	> IND, RES
Diethyl Phthalate	0.200 B	< 5.8	4 / 8	1000000	63000	0.63 ³	No	> ECO
Dimethylphthalate	5.8 J	< 0.500	1 / 8	1000000	780000	—	No	No
Heptachlor	ND	< 6.38	0 / 3	1.3	0.14	0.069 ⁴	No	> IND, RES, ECO
Hexachlorobenzene	ND	< 5.8	0 / 8	3.6	0.4	—	No	> IND, RES
Hexachlorobutadiene	ND	< 5.80	0 / 8	73	8.2	—	No	No
Hexachloroethane	ND	< 5.80	0 / 8	410	46	1.0	No	> ECO
Indeno(1,2,3-cd)pyrene	ND	< 5.80	0 / 8	7.8	0.88	—	No	> RES
Isophorone	ND	< 5.80	0 / 8	6000	670	—	No	No
m,p-Cresol	55.3	< 0.500	3 / 8	10000	390	—	No	No
m-Toluidine	6.62	< 5.80	1 / 8	30	3.4	—	> RES	> RES
N-Nitrosodibutylamine	ND	< 5.80	0 / 8	1.1	0.12	—	No	> IND, RES
N-Nitrosodimethylamine	ND	< 5.80	0 / 8	0.11	0.013	—	No	> IND, RES
N-Nitrosodiphenylamine	6.80	< 7.54	1 / 8	1200	130	—	No	No
N-Nitrosodipropylamine	ND	< 5.80	0 / 8	0.82	0.091	—	No	> IND, RES
Nitrobenzene	13.0	< 5.80	2 / 8	1000	39	—	No	No
o,p-Toluidine	499 J	< 1.51	3 / 8	30	3.4	—	> IND, RES	No
o-Cresol	5.30	< 0.300	2 / 7	100000	3900	—	No	No
o-Nitrotoluene	4.70	< 5.80	1 / 8	20000	780	—	No	No
p-Chloroaniline	59.0	< 0.200	7 / 8	8200	310	—	No	No
p-Nitrotoluene	5.50	< 8.70	2 / 8	20000	780	—	No	No
Pentachloronitrobenzene	ND	< 5.80	0 / 8	22	2.5	—	No	> RES
Pentachlorophenol	ND	< 0.400	0 / 8	48	5.3	—	No	No
Phenol	20.7 J	< 0.100	4 / 8	1000000	47000	0.0329	>ECO	> ECO

NA - Not applicable.

"J" - Estimated value.

ND - Not detected.

"B" - Blank contamination.

(1) "mg/kg" - Units reported in milligrams per kilogram (equivalent to parts per million) unless otherwise noted.

(2) ER-L from Long et al. (1995)

(3) SQB based on Tier II value from USEPA (1996)

(4) Sediment criterion based on Tier II value from Jones et al. (1996)

--" - Value not available for this constituent.

TABLE 6-3
Surface Water Analytical Results for SWMU 4: Ash Lagoon

SAMPLE ID	SM004-SW11
SAMPLE DEPTH(ft)	0.00-0.00
SAMPLE LOCATION	SW11
SAMPLE DATE	6/19/1997
PARAMETER	
Volatiles (µg/L)	
1,1,1,2-Tetrachloroethane	<1
1,1,1-Trichloroethane	<1
1,1,2,2-Tetrachloroethane	<2
1,1,2-Trichloroethane	<2
1,1-Dichloroethane	<2
1,1-Dichloroethene	<1
1,1-Dichloropropene	<1
1,2,3-Trichlorobenzene (VOAS)	<1
1,2,3-Trichloropropane	<1
1,2,4-Trichlorobenzene (VOAS)	<1
1,2,4-Trimethylbenzene	<1
1,2-Dibromo-3-chloropropane	<3
1,2-Dibromoethane	<1
1,2-Dichlorobenzene (VOAS)	5
1,2-Dichloroethane	<2
1,2-Dichloropropene	<1
1,3,5-Trimethylbenzene	<1
1,3-Dichlorobenzene (VOAS)	<2
1,3-Dichloropropane	<1
1,4-Dichlorobenzene (VOAS)	<2
2,2-Dichloropropane	<1
2-Butanone	<3
2-Chloroethyl Vinyl Ether	R
2-Chlorotoluene	<1
2-Hexanone	<7
4-Chlorotoluene	<1
4-Methyl-2-pentanone	<5
Acetone	<6
Acrolein	<40
Acrylonitrile	<10
Allyl Chloride	<1
Benzene	2 J
Bromobenzene	<1
Bromochloromethane	<1
Bromodichloromethane	<1
Bromoform	<1
Bromomethane	<3
Carbon Disulfide	<3
Carbon Tetrachloride	<1
Chlorobenzene	6
Chloroethane	<3
Chloroform	<1
Chloromethane	<3
Dibromochloromethane	<2
Dibromomethane	<1
Dichlorodifluoromethane	<2
Ethyl Methacrylate	<1
Ethylbenzene	<2
Freon 113	<2
Freon 141b	<1
Hexachlorobutadiene (VOAS)	<2
Isopropylbenzene	<2
Methyl Iodide	<1
Methylene Chloride	<2
Naphthalene (VOAS)	<1
Styrene	<1
Tetrachloroethene	<1
Toluene	3 J
Trichloroethene	<1
Trichlorofluoromethane	<2
Vinyl Acetate	<2
Vinyl Chloride	<2
cis-1,2-Dichloroethene	<2
cis-1,3-Dichloropropene	<1
m+p-Xylene	<1
n-Butylbenzene	<1

TABLE 6-3
Surface Water Analytical Results for SWMU 4: Ash Lagoon

PARAMETER	SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE	SM004-SW11 0.00-0.00 SW11 6/19/1997
n-Propylbenzene	< 1	
o-Xylene	< 1	
p-Isopropyltoluene	< 1	
sec-Butylbenzene	< 1	
tert-Butylbenzene	< 1	
trans-1,2-Dichloroethene	< 2	
trans-1,3-Dichloropropene	< 1	
trans-1,4-Dichloro-2-butene	< 15	
Semivolatiles (µg/L)		
1,2,3-Trichlorobenzene (SVOA)	< 24	
1,2,4,5-Tetrachlorobenzene	< 24	
1,2,4-Trichlorobenzene (SVOA)	< 20	
1,2-Dichlorobenzene (SVOA)	< 20 J	
1,3-Dichlorobenzene (SVOA)	< 20	
1,4-Dichlorobenzene (SVOA)	< 20	
1-Chloronaphthalene	< 50	
1-Methylnaphthalene	< 20	
1-Naphthylamine	< 68	
2,3,4,6-Tetrachlorophenol	< 40	
2,3-Dichloroaniline	< 20	
2,4,5-Trichlorophenol	< 20	
2,4,6-Trichlorophenol	< 20	
2,4-Dichlorophenol	< 20	
2,4-Dimethylphenol	< 20	
2,4-Dinitrophenol	< 124	
2,4-Dinitrotoluene	< 20	
2,4-Toluenediamine	< 100	
2,6-Dichlorophenol	< 20	
2,6-Dinitrotoluene	< 20	
2-Chloronaphthalene	< 20	
2-Chlorophenol	< 20	
2-Methylnaphthalene	< 20	
2-Naphthylamine	< 76	
2-Nitroaniline	< 24	
2-Nitrodiphenylamine	< 20	
2-Nitrophenol	< 20	
2-Picoline	< 74	
3,3'-Dichlorobenzidine	< 122	
3-Methylcholanthrene	< 20	
3-Nitroaniline	< 20	
4,4' Methyleneedianiline	< 176 J	
4,6-Dinitro-o-cresol	< 20	
4-Aminobiphenyl	< 20	
4-Aminodiphenylamine	< 50	
4-Bromophenyl phenyl ether	< 20	
4-Chloro-m-cresol	< 20	
4-Chlorophenylphenyl ether	< 20	
4-Nitroaniline	< 20	
4-Nitrophenol	< 20 J	
5-Nitro-o-toluidine	< 20	
7,12-dimethylbenz[a]anthracene	< 20	
Acenaphthene	< 20	
Acenaphthylene	< 20	
Acetophenone	< 26	
Aniline	< 28 J	
Anthracene	< 20	
Azobenzene	< 24	
Benzidine	< 320	
Benzo(a)anthracene	< 26	
Benzo(a)pyrene	< 20	
Benzo(b)fluoranthene	< 20	
Benzo(ghi)perylene	< 22	
Benzo(k)fluoranthene	< 20	

TABLE 6-3
Surface Water Analytical Results for SWMU 4: Ash Lagoon

SAMPLE ID	SM004-SW11
SAMPLE DEPTH(ft)	0.00-0.00
SAMPLE LOCATION	SW11
SAMPLE DATE	6/19/1997
PARAMETER	
Benzoic Acid	< 20
Benzyl Alcohol	< 20
Benzyl butyl phthalate	< 20
Bis(2-chloroethoxymethane)	< 20
Bis(2-chloroethyl)ether	< 20
Bis(2-chloroisopropyl)ether	< 20
Bis(2-ethylhexyl) phthalate	< 24
Bisphenol A	310 J
Carbazole	< 100
Chrysene	< 20
Cyclohexanone	< 20
Di-n-butyl phthalate	< 20
Di-n-octyl phthalate	< 20
Dibenzo(a,h)anthracene	< 20
Dibenzofuran	< 20
Diethyl Phthalate	< 20
Dimethylphthalate	< 20
Ethyl Methane Sulfonate	< 36
Fluoranthene	< 20
Fluorene	< 20 J
Heptachlor	< 22
Hexachlorobenzene	< 20
Hexachlorobutadiene (SVOA)	< 20
Hexachlorocyclopentadiene	< 20
Hexachloroethane	< 20
Indeno(1,2,3-cd)pyrene	< 20
Isophorone	< 20
Methyl methane sulfonate	< 20
N-Nitrosodibutylamine	< 20
N-Nitrosodimethylamine	< 20 J
N-Nitrosodiphenylamine	< 26
N-Nitrosodipropylamine	< 20
N-Nitrosopiperidine	< 20
Naphthalene (SVOA)	< 20
Nitrobenzene	< 20
Pentachlorobenzene	< 34
Pentachloronitrobenzene	< 20
Pentachlorophenol	< 20
Phenacetin	< 20
Phenanthrene	< 20
Phenol	< 12 J
Pyrene	< 20
Pyridine	< 22
Trimethylphosphate	< 20
Triphenylphosphate	< 100
m,p-Cresol	14700 J
m-Nitrotoluene	< 20
m-Toluidine	< 40
o,p-Toluidine	< 102 J
o-Cresol	< 20
o-Nitrotoluene	< 20
p-Chloroaniline	< 20
p-Dimethylaminoazobenzene	< 20
p-Nitrotoluene	< 30
Metals ($\mu\text{g/L}$)	
Antimony	4.5 J
Cadmium	< 4
Chromium	< 3
Lead	< 4
Nickel	30 JB
Miscellaneous ($\mu\text{g/L}$)	
Total Organic Carbon	52900
Biological Oxygen Demand	8200 J
Chemical Oxygen Demand (low)	131000 J
Nitrate	< 10
Nitrite	< 400
Oil & Grease	7000 J
Total Dissolved Solids	1570000 J
Total Kjeldahl Nitrogen	< 1000
Total Suspended Solids	3500 J
pH (std units)	7.7 J

B=Blank Contamination

J=Estimated Value

NA=Not Analyzed

R=Data Rejected For Quality Reasons

TABLE 6-4
Comparison to Risk-Based Criteria
SWMU 4: Ash Lagoon – Surface Water

Constituent	Maximum Detected Concentration (ug/L) ⁽¹⁾	Maximum Detection Limit for Non-Detects (ug/L)	Frequency of Detection	EPA Region III Risk-Based Concentrations Tap Water ⁽²⁾ (ug/L)	Human Health AWQC Water and Organisms ⁽³⁾ (ug/L)	Freshwater Ecological AWQC ⁽³⁾ (ug/L)	Maximum Detection Exceeds Criteria	Maximum Detection Limit Exceeds Criteria
MISCELLANEOUS								
Biological Oxygen Demand	8200 J	NA	1/1	--	--	--	No	No
Chemical Oxygen Demand (low)	131000 J	NA	1/1	--	--	--	No	No
Oil & Grease	7000 J	NA	1/1	--	--	--	No	No
pH (std. units)	7.7 J	NA	1/1	--	--	6.5 - 9.0	No	No
Total Dissolved Solids	1570000 J	NA	1/1	--	--	--	No	No
Total Organic Carbon	52900	NA	1/1	--	--	--	No	No
Total Suspended Solids	3500 J	NA	1/1	--	--	--	No	No
METALS								
Antimony	4.5 J	NA	2/2	15	14	30	No	No
Nickel	30 JB	<4.0	2/2	730	610	160	No	No
VOLATILES								
1,1,1,2-Tetrachloroethane	ND	<2.0	0/2	0.41	--	2,400	No	> RBC
1,1,2,2-Tetrachloroethane	ND	<2.0	0/2	0.052	0.17	2,400	No	> RBC, HAWQC
1,1,2-Trichloroethane	ND	<2.0	0/2	0.19	0.6	9,400	No	> RBC, HAWQC
1,1-Dichloroethene	ND	<2.0	0/2	0.044	0.057	46.6 ⁴	No	> RBC,HAWQC
1,2,3-Trichloropropane	ND	<3.0	0/2	0.0015	--	--	No	> RBC
1,2-Dibromo-3-chloropropane	ND	<10.0	0/2	0.048	--	--	No	> RBC
1,2-Dibromoethane	ND	<2.0	0/2	0.00075	--	--	No	> RBC
1,2-Dichloroethane	ND	<2.0	0/2	0.12	0.94	20,000	No	> RBC, HAWQC
1,2-Dichloropropane	ND	<2.0	0/2	0.16	--	--	No	> RBC
Acrylonitrile	ND	<10	0/2	0.12	0.058	2,600	No	> RBC,HAWQC
Benzene	2.0 J	<3.0	1/2	0.36	0.66	46 ⁴	> RBC, HAWQC	> RBC,HAWQC
Bromodichloromethane	ND	<3.0	0/2	0.17	--	1,100 ⁵	No	> RBC
Carbon Tetrachloride	ND	<2.0	0/2	0.16	0.4	229 ⁴	No	> RBC,HAWQC
Chlorobenzene	6	<2.0	1/2	39	--	130 ⁴	No	No
Chloroform	ND	<1.0	0/2	0.15	0.19	1,240	No	> RBC,HAWQC
Chloromethane	ND	<3.0	0/2	1.4	--	1100 ⁵	No	> RBC
cis-1,3-Dichloropropene	ND	<2.0	0/2	0.077	87	244	No	> RBC
Dibromochloromethane	ND	<2.0	0/2	0.13	--	1100 ⁵	No	> RBC
Toluene	3.0 J	<2.0	1/2	750	14300	130 ⁴	No	No
trans-1,3-Dichloropropene	ND	<2.0	0/2	0.077	87	244	No	> RBC
Vinyl Chloride	ND	<2.0	0/2	0.019	2	87.8 ⁴	No	> RBC
SEMVOLATILES								
1,2,4,5-Tetrachlorobenzene	ND	<24	0/2	1.8	38	--	No	> RBC
1,4-Dichlorobenzene	ND	<2.0	0/2	0.44	400	15 ⁴	No	> RBC
1-Naphthylamine	ND	<68	0/2	0.00052	--	--	No	> RBC
2,4,6-Trichlorophenol	ND	<20	0/2	6.1	1.2	970	No	> RBC,HAWQC
2,4-Dinitrophenol	ND	<124	0/2	73	--	--	No	> RBC
2,4-Toluenediamine	ND	<100	0/2	0.021	--	--	No	> RBC
2-Naphthylamine	ND	<76	0/2	0.00052	--	--	No	> RBC
2-Nitroaniline	ND	<24	0/2	2.2	--	--	No	> RBC
3,3'-Dichlorobenzidine	ND	<122	0/2	0.15	0.0103	--	No	> RBC,HAWQC
4,6-Dinitro-o-cresol	ND	<20	0/2	3.7	13.4	--	No	> RBC,HAWQC
5-Nitro-o-toluidine	ND	<20	0/2	2	--	--	No	> RBC
Acetophenone	ND	<26	0/2	0.042	--	--	No	> RBC
Aniline	ND	<28	0/2	10	--	--	No	> RBC
Azobenzene	ND	<24	0/2	0.61	--	--	No	> RBC

TABLE 6-4
Comparison to Risk-Based Criteria
SWMU 4: Ash Lagoon – Surface Water

Constituent	Maximum Detected Concentration (ug/L) ⁽¹⁾	Maximum Detection Limit for Non-Detects (ug/L)	Frequency of Detection	EPA Region III Risk-Based Concentrations Tap Water ⁽²⁾ (ug/L)	Human Health AWQC Water and Organisms ⁽³⁾ (ug/L)	Freshwater Ecological AWQC ⁽⁴⁾ (ug/L)	Maximum Detection Exceeds Criteria	Maximum Detection Limit Exceeds Criteria
Benzidine	ND	< 320	0/2	0.00029	0.00012	3.86 ⁵	No	> RBC, HAWQC, ECO
Benzo(a)anthracene	ND	< 26	0/2	0.092	--	0.027	No	> RBC, ECO
Benzo(a)pyrene	ND	< 20	0/2	0.0092	--	0.014	No	> RBC, ECO
Benzo(b)fluoranthene	ND	< 20	0/2	0.092	--	--	No	> RBC
Benzo(k)fluoranthene	ND	< 20	0/2	0.92	--	--	No	> RBC
Bis(2-chloroethyl)ether	ND	< 20	0/2	0.0092	--	--	No	> RBC
Bis(2-chloroisopropyl)ether	ND	< 20	0/2	0.26	--	--	No	> RBC
Bis(2-ethylhexyl) phthalate	2.85 B	< 24	1/2	4.8	--	160	No	> RBC
Bisphenol A	310 J	< 3.0	2/2	1800	--	--	No	No
Carbazole	ND	< 100	0/1	3.4	--	--	No	> RBC
Chrysene	ND	< 20	0/2	9.2	--	--	No	> RBC
Dibenz(a,h)anthracene	ND	< 20	0/2	0.0092	--	--	No	> RBC
Heptachlor	ND	< 22	0/2	0.0023	0.00025	0.0038	No	> RBC, HAWQC, ECO
Hexachlorobenzene	ND	< 20	0/2	0.0066	0.00072	3.7	No	> RBC, HAWQC, ECO
Hexachlorobutadiene	ND	< 2.0	0/2	0.14	0.45	9.3	No	> RBC, HAWQC
Hexachlorocyclopentadiene	ND	< 20	0/2	0.15	206	5.2	No	> RBC, ECO
Hexachloroethane	ND	< 20	0/2	0.75	1.9	540	No	> RBC, HAWQC
Indeno(1,2,3-cd)pyrene	ND	< 20	0/2	0.092	--	--	No	> RBC
m,p-Cresol	14700 J	< 5.0	1/2	180	--	--	> RBC	No
m-Toluidine	ND	< 40	0/2	0.35	--	--	No	> RBC
N-Nitrosodibutylamine	ND	< 20	0/2	0.012	0.0064	--	No	> RBC, HAWQC
N-Nitrosodimethylamine	ND	< 20	0/2	0.0013	0.0014	--	No	> RBC, HAWQC
N-Nitrosodiphenylamine	ND	< 26	0/2	14	4.9	24.5 ⁴	No	> RBC, HAWQC, ECO
N-Nitrosodipropylamine	ND	< 20	0/2	0.0096	--	--	No	> RBC
Nitrobenzene	ND	< 20	0/2	3.4	19800	2,700 ⁶	No	> RBC
o,p-Toluidine	ND	< 102	0/2	0.35	--	--	No	> RBC
Pentachlorobenzene	ND	< 34	0/2	4.9	74	0.047	No	> RBC, ECO
Pentachlorotriobenzene	ND	< 20	0/2	0.041	--	--	No	> RBC
Pentachlorophenol	ND	< 20	0/2	0.56	1010	13	No	> RBC, ECO
Trimethylphosphate	ND	< 20	0/2	1.8	--	--	No	> RBC

"J" - Estimated value.

NA - Not applicable.

"B" - Blank contamination.

ND - Not detected.

⁽¹⁾ "ug/L" - Units reported in micrograms per liter (equivalent to parts per billion) unless otherwise noted.

⁽²⁾ USEPA Region III, 1998

⁽³⁾ USEPA, 1993

⁽⁴⁾ Chronic tier II value from USEPA (1996) or Suter (1996)

⁽⁵⁾ AWQC for halomethanes. A chronic value was estimated from the acute value by division with an uncertainty value of 10.

⁽⁶⁾ A chronic value was estimated from the acute value by division with an uncertainty value of 10.

--" - Value not available for this constituent.

TABLE 6-5
Sediment Analytical Results for Beaver Run Lagoon

SAMPLE ID	SM004-SD01-0001	SM004-SD01-0001R	SM004-SD01-0405	SM004-SD02-0001	SM004-SD02-0001DR	SM004-SD02-0001R	SM004-SD02-0405	SM004-SD03-0001	SM004-SD03-0405	SM004-SD04-0001	SM004-SD04-0405
SAMPLE DEPTH(ft)	0.00-1.00	0.00-0.00	4.00-5.00	0.00-1.00	0.00-0.00	0.00-0.00	4.00-5.00	0.00-1.00	4.00-5.00	0.00-1.00	4.00-5.00
SAMPLE LOCATION	SD01	SD01	SD01	SD02	SD02	SD02	SD02	SD03	SD03	SD04	SD04
SAMPLE DATE	6/18/1997	2/25/1998	6/18/1997	2/25/1998	6/18/1997	2/25/1998	6/18/1997	6/18/1997	6/18/1997	6/18/1997	6/18/1997
PARAMETER											
Volatiles (pg/kg)											
1,1,1,2-Tetrachloroethane	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
1,1,1-Trichloroethane	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
1,1,2,2-Tetrachloroethane	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
1,1,2-Trichloroethane	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
1,1-Dichloroethane	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
1,1-Dichloroethene	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
1,1-Dichloropropene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
1,2,3-Trichlorobenzene (VOAS)	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
1,2,3-Trichloropropane	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
1,2,4-Trichlorobenzene (VOAS)	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
1,2,4-Trimethylbenzene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
1,2-Dibromo-3-chloropropane	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
1,2-Dibromoethane	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
1,2-Dichlorobenzene (VOAS)	939 J	NA	602 J	631 J	NA	NA	< 313	< 661	965	< 591	< 415
1,2-Dichloroethane	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
1,2-Dichloropropane	< 648	NA	< 738	< 922	NA	NA	< 475	< 1010	< 516	< 898	< 631
1,3,5-Trimethylbenzene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
1,3-Dichlorobenzene (VOAS)	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
1,3-Dichloropropane	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
1,4-Dichlorobenzene (VOAS)	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
2,2-Dichloropropane	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
2-Butanone	< 1500	NA	< 1710	< 2140	NA	NA	< 1100	< 2330	< 1200	< 2080	< 1460
2-Chloroethyl Vinyl Ether	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
2-Chrotoluen	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
2-Hexanone	< 648	NA	< 738	< 922	NA	NA	< 475	< 1010	< 516	< 898	< 631
4-Chlorotoluene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
4-Methyl-2-pentanone	< 648	NA	< 738	< 922	NA	NA	< 475	< 1010	< 516	< 898	< 631
Acetone	< 1500	NA	< 1710	< 2140	NA	NA	< 1100	< 2330	< 1200	< 2080	< 1460
Acrolein	< 4270	NA	< 4850	< 6070	NA	NA	< 3130	< 6610	< 3400	< 5910	< 4150
Acrylonitrile	< 2220	NA	< 2520	< 3160	NA	NA	< 1630	< 3440	< 1770	< 3070	< 2160
Allyl Chloride	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Benzene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Bromobenzene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Bromochloromethane	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Bromodichloromethane	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
Bromoform	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Bromomethane	< 648	NA	< 738	< 922	NA	NA	< 475	< 1010	< 516	< 898	< 631
Carbon Disulfide	< 648	NA	< 738	< 922	NA	NA	< 475	< 1010	< 516	< 898	< 631
Carbon Tetrachloride	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Chlorobenzene	1160	NA	641 J	4370	NA	NA	< 163	1670	693 J	4260	233 J
Chloroethane	< 648	NA	< 738	< 922	NA	NA	< 475	< 1010	< 516	< 898	< 631
Chloroform	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Chloromethane	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
Dibromochloromethane	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Dibromomethane	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Dichlorodifluoromethane	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
Ethyl Methacrylate	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Ethylbenzene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Freon 113	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
Freon 141b	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Hexachlorobutadiene (VOAS)	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415

TABLE 6-5
Sediment Analytical Results for Beaver Run Lagoon

SAMPLE ID	SM004-SD01-0001	SM004-SD01-0001R	SM004-SD01-0405	SM004-SD02-0001	SM004-SD02-0001DR	SM004-SD02-0001R	SM004-SD02-0405	SM004-SD03-0001	SM004-SD03-0405	SM004-SD04-0001	SM004-SD04-0405
SAMPLE LOCATION	0.00-1.00 SD01 6/18/1997	0.00-0.00 SD01 2/25/1998	4.00-5.00 SD01 6/18/1997	0.00-1.00 SD02 6/18/1997	0.00-0.00 SD02 2/25/1998	4.00-5.00 SD02 2/25/1998	0.00-1.00 SD03 6/18/1997	4.00-5.00 SD03 6/18/1997	0.00-1.00 SD04 6/18/1997	4.00-5.00 SD04 6/18/1997	4.00-5.00 SD04 6/18/1997
SAMPLE DATE											
PARAMETER											
Isopropylbenzene	< 648	NA	< 738	< 922	NA	NA	< 475	< 1010	< 516	< 898	< 631
Methyl Iodide	< 648	NA	< 738	< 922	NA	NA	< 475	< 1010	< 516	< 898	< 631
Methylene Chloride	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
Naphthalene (VOAS)	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Styrene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Tetrachloroethene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Toluene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Trichloroethene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
Trichlorofluoromethane	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
Vinyl Acetate	< 648	NA	< 738	< 922	NA	NA	< 475	< 1010	< 516	< 898	< 631
Vinyl Chloride	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
cis-1,2-Dichloroethene	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
cis-1,3-Dichloropropene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
m+p-Xylene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
n-Butylbenzene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
n-Propylbenzene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
o-Xylene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
p-Isopropyltoluene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
sec-Butylbenzene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
tert-Butylbenzene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
trans-1,2-Dichloroethene	< 427	NA	< 485	< 607	NA	NA	< 313	< 661	< 340	< 591	< 415
trans-1,3-Dichloropropene	< 222	NA	< 252	< 316	NA	NA	< 163	< 344	< 177	< 307	< 216
trans-1,4-Dichloro-2-butene	< 2220	NA	< 2520	< 3160	NA	NA	< 1630	< 3440	< 1770	< 3070	< 2160
Semivolatiles (µg/kg)											
1,2,3-Trichlorobenzene (SVOA)	< 700 J	< 1923	< 900	R	< 482	< 484	< 380	< 3360	NA	R	< 660
1,2,4,5-Tetrachlorobenzene	< 700 J	< 1923	< 900	R	< 482	< 484	< 380	< 3360	NA	R	< 660
1,2,4-Trichlorobenzene (SVOA)	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
1,2-Dichlorobenzene (SVOA)	< 580 J	3894	< 750 J	R	< 402	< 403	< 310 J	< 2800 J	NA	R	< 550 J
1,3-Dichlorobenzene (SVOA)	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
1,4-Dichlorobenzene (SVOA)	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
1-Chloronaphthalene	< 1460 J	< 4006	< 1890	R	< 1004	< 1008	< 780	< 7000	NA	R	< 1380
1-Methylnaphthalene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
1-Naphthylamine	< 1980 J	< 5449	< 2560	R	< 1365	< 1371	< 1060	< 9520	NA	R	< 1880
2,3,4,6-Tetrachlorophenol	R	< 3205	< 1510	R	< 803	< 806	< 620	< 5600	NA	R	< 1100
2,3-Dichloroaniline	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2,4,5-Trichlorophenol	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2,4,6-Trichlorophenol	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2,4-Dichlorophenol	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2,4-Dimethylphenol	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2,4-Dinitrophenol	R	< 9936	< 4680	R	< 2490	< 2500	< 1940	< 17400	NA	R	< 3420
2,4-Dinitrotoluene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2,4-Toluenediamine	< 2910 J	< 8013	< 3770	R	< 2008	< 2016	< 1560	< 14000	NA	R	< 2760
2,6-Dichlorophenol	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2,6-Dinitrotoluene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2-Chloronaphthalene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2-Chlorophenol	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2-Methylnaphthalene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2-Naphthylamine	< 2210 J	< 6090	< 2870	R	< 1526	< 1532	< 1190	< 10600	NA	R	< 2100
2-Nitroaniline	< 700 J	< 1923	< 900	R	< 482	< 484	< 380	< 3360	NA	R	< 660
2-Nitrodiphenylamine	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2-Nitrophenol	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
2-Picoline	< 2150 J	< 5929	< 2790	R	< 1486	< 1492	< 1160	< 10400	NA	R	< 2040
3,3'-Dichlorobenzidine	< 3550 J	< 9776	< 4600	R	< 2450	< 2460	< 1910	< 17100	NA	R	< 3370
3-Methylcholanthrene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550

LE 6-5
Sediment Analytical Results for Beaver Run Lagoon

SAMPLE ID	SM004-SD01-0001	SM004-SD01-0001R	SM004-SD01-0405	SM004-SD02-0001	SM004-SD02-0001DR	SM004-SD02-0001R	SM004-SD02-0405	SM004-SD03-0001	SM004-SD03-0405	SM004-SD04-0001	SM004-SD04-0405
SAMPLE DEPTH(ft)	0.00-1.00	0.00-0.00	4.00-5.00	0.00-1.00	0.00-0.00	0.00-0.00	4.00-5.00	0.00-1.00	4.00-5.00	0.00-1.00	4.00-5.00
SAMPLE LOCATION	SD01	SD01	SD01	SD02	SD02	SD02	SD02	SD03	SD03	SD04	SD04
SAMPLE DATE	6/18/1997	2/25/1998	6/18/1997	6/18/1997	2/25/1998	2/25/1998	6/18/1997	6/18/1997	6/18/1997	6/18/1997	6/18/1997
PARAMETER											
3-Nitroaniline	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
4,4' Methyleneedianiline	< 5130 J	< 14102	< 6640 J	R	< 3534	< 3548	< 2750 J	< 24600 J	NA	R	< 4860 J
4,6-Dinitro-o-cresol	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
4-Aminobiphenyl	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
4-Aminodiphenylamine	< 1460 J	< 4006	< 1890	R	< 1004	< 1008	< 780	< 7000	NA	R	< 1380
4-Bromophenyl phenyl ether	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
4-Chloro-m-cresol	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
4-Chlorophenylphenyl ether	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
4-Nitroaniline	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
4-Nitrophenol	R	< 1603	< 750 J	R	< 402	< 403	< 310 J	< 2800 J	NA	R	< 550 J
5-Nitro-o-toluidine	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
7,12-dimethylbenz[a]anthracene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Acenaphthene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Acenaphthylene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
(Acetophenone)	< 760 J	< 2083	< 980	R	< 522	< 524	< 410	< 3640	NA	R	< 720
Aniline	< 820 J	< 2244	< 1060 J	R	< 562	< 565	< 440 J	< 3920 J	NA	R	< 770 J
Anthracene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Azobenzene	< 700 J	< 1923	< 900	R	< 482	< 484	< 380	< 3360	NA	R	< 660
Benzidine	< 9320 J	< 25641 J	< 12100	R	< 6426 J	< 6452 J	< 5000	< 44800	NA	R	< 8830
Benzo(a)anthracene	< 760 J	< 2083	< 980	R	< 522	< 524	< 410	< 3640	NA	R	< 720
Benzo(a)pyrene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Benzo(b)fluoranthene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Benzo(ghi)perylene	< 640 J	< 1763	< 830	R	< 442	< 444	< 340	< 3080	NA	R	< 610
Benzo(k)fluoranthene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Benzoic Acid	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Benzyl Alcohol	R	< 1603	< 750	R	< 402	< 403	< 310	4060	NA	R	< 550
Benzyl butyl phthalate	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Bis(2-chloroethoxymethane)	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Bis(2-chloroethyl)ether	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Bis(2-chloroisopropyl)ether	< 580 J	< 1603 J	< 750	R	< 402 J	< 403 J	< 310	< 2800	NA	R	< 550
Bis(2-ethylhexyl) phthalate	< 700 J	< 1923 J	2240 B	5020 JB	< 482 J	806 JB	1970 JB	7490 B	NA	R	2740 B
Bisphenol A	8620 J	3958 J	11500 J	R	20968 J	21370 J	5000 J	< 5040 J	NA	17200 J	9440 J
Carbazole	< 2910 J	< 8013	< 3770	R	< 2008	< 2016	< 1560	< 14000	NA	R	< 2760
Chrysene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Cyclohexanone	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Di-n-butyl phthalate	4660 JB	107690 B	18800 B	10500 JB	103226 B	46370 B	4780 B	23900 B	NA	4450 JB	10700 B
Di-n-octyl phthalate	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Dibenzo(a,h)anthracene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Dibenzofuran	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Diethyl Phthalate	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Dimethylphthalate	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Ethyl Methane Sulfonate	< 1050 J	< 2885	< 1360	R	< 723	< 726	< 560	< 5040	NA	R	< 990
Fluoranthene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550
Fluorene	< 580 J	< 1603	< 750 J	R	< 402	< 403	< 310 J	< 2800 J	NA	R	< 550 J
Heptachlor	< 640 J	< 1763	< 830	R	< 442	< 444	< 340	< 3080	NA	R	< 610

TABLE 6-5
Sediment Analytical Results for Beaver Run Lagoon

SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE	SM004-SD01-0001 0.00-1.00 SD01 6/18/1997	SM004-SD01-0001R 0.00-0.00 SD01 2/25/1998	SM004-SD01-0405 4.00-5.00 SD01 6/18/1997	SM004-SD02-0001 0.00-1.00 SD02 6/18/1997	SM004-SD02-0001DR 0.00-0.00 SD02 2/25/1998	SM004-SD02-0001R 0.00-0.00 SD02 2/25/1998	SM004-SD02-0405 4.00-5.00 SD02 6/18/1997	SM004-SD03-0001 0.00-1.00 SD03 6/18/1997	SM004-SD03-0405 4.00-5.00 SD03 6/18/1997	SM004-SD04-0001 0.00-1.00 SD04 6/18/1997	SM004-SD04-0405 4.00-5.00 SD04 6/18/1997	
PARAMETER												
Hexachlorobenzene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Hexachlorobutadiene (SVOA)	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Hexachlorocyclopentadiene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Hexachloroethane	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Indeno(1,2,3-cd)pyrene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Isophorone	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Methyl methane sulfonate	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
N-Nitrosodibutylamine	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
N-Nitrosodimethylamine	< 580 J	< 1603	< 750 J	R	< 402	< 403	< 310 J	< 2800 J	NA	R	< 550 J	
N-Nitrosodiphenylamine	< 760 J	< 2083	< 980	R	< 522	< 524	< 410	< 3640	NA	R	< 720	
N-Nitrosodipropylamine	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
N-Nitrosopiperidine	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Naphthalene (SVOA)	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Nitrobenzene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Pentachlorobenzene	< 990 J	< 2724	< 1280	R	< 683	< 685	< 530	< 4760	NA	R	< 940	
Pentachloronitrobenzene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Pentachlorophenol	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Phenacetin	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Phenanthrene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Phenol	R	< 962	< 450 J	R	< 241	< 242	< 190 J	< 1680 J	NA	R	< 330 J	
Pyrene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Pyridine	< 640 J	< 1763	< 830	R	< 442	< 444	< 340	< 3080	NA	R	< 610	
Trimethylphosphate	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
Triphenylphosphate	< 2910 J	< 8013	< 3770	R	< 2008	< 2016	< 1560	< 14000	NA	R	< 2760	
m,p-Cresol	R	< 2404	< 1130 J	R	< 602	< 605	< 470 J	< 4200 J	NA	R	< 830 J	
m-Nitrotoluene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
m-Toluidine	< 1160 J	< 3205	< 1510	R	< 803	< 806	< 620	< 5600	NA	R	< 1100	
o,p-Toluidine	< 2970 J	< 8173	< 3850 J	R	< 2048	< 2056	< 1590 J	< 14300 J	NA	R	< 2810 J	
o-Cresol	R	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
o-Nitrotoluene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
p-Chloroaniline	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
p-Dimethylaminoazobenzene	< 580 J	< 1603	< 750	R	< 402	< 403	< 310	< 2800	NA	R	< 550	
p-Nitrotoluene	< 870 J	< 2404	< 1130	R	< 602	< 605	< 470	< 4200	NA	R	< 830	
Metals (µg/kg)												
Antimony	< 683	NA	< 777		NA	NA	< 500	< 1058	< 543	< 946	< 664	
Cadmium	2370 J	NA	4780 J	2280 J	NA	NA	780 J	2910 J	< 540	< 950	1350 J	
Chromium	52130 J	NA	88170 J	70440 J	NA	NA	26310 J	44550 J	21200 J	68300 J	31210 J	
Lead	85947 J	NA	169084 J	39053 J	NA	NA	15323 J	81550 J	25664 J	30801 J	33757 J	
Nickel	62820 J	NA	56290 J	113350 J	NA	NA	21090 J	84440 J	33750 J	77830 J	57030 J	
Miscellaneous (µg/kg)												
Percent Moisture	41 %	38 %	49 %	59 %	NA	50 %	20 %	62 %	26 %	58 %	40 %	
Total Organic Carbon	20600000	NA	25900000	14800000	NA	NA	3200000	15800000	7800000	13200000	5200000	
pH in Water (Solid Sample)	5.6 std	NA	6.2 std	6.3 std	NA	NA	6.6 std	6.5 std	7 std	6.4 std	6.5 std	

B=Blank Contamination

J=Estimated Value

NA=Not Analyzed

R=Data Rejected For Quality Reasons

LE 6-5
Sediment Analytical Results for Beaver Run Lagoon

SAMPLE ID	SM004-SD05-0001	SM004-SD05-0405	SM004-SD06-0001	SM004-SD06-0001FDC	SM004-SD06-0001R	SM004-SD06-0405	SM004-SD07-0001	SM004-SD07-0001R	SM004-SD08	SM004-SD09
SAMPLE DEPTH(ft)	0.00-1.00	4.00-5.00	0.00-1.00	0.00-1.00	0.00-0.00	4.00-5.00	0.00-1.00	0.00-0.00	0.00-0.00	0.00-0.00
SAMPLE LOCATION	SD05	SD05	SD06	SD06	SD06	SD06	SD07	SD07	SD08	SD09
SAMPLE DATE	6/18/1997	6/18/1997	7/3/1997	6/18/1997	2/25/1998	6/18/1997	6/18/1997	2/25/1998	6/19/1997	6/18/1997
PARAMETER										
Volatiles (µg/kg)										
1,1,1,2-Tetrachloroethane	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
1,1,1-Trichloroethane	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
1,1,2,2-Tetrachloroethane	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
1,1,2-Trichloroethane	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
1,1-Dichloroethane	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
1,1-Dichloroethene	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
1,1-Dichloropropene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
1,2,3-Trichlorobenzene (VOAS)	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
1,2,3-Trichloropropane	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
1,2,4-Trichlorobenzene (VOAS)	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
1,2,4-Trimethylbenzene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
1,2-Dibromo-3-chloropropane	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
1,2-Dibromoethane	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
1,2-Dichlorobenzene (VOAS)	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
1,2-Dichloroethane	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
1,2-Dichloropropene	< 752	< 482	< 823	< 805	NA	< 513	< 745	NA	< 482	< 380
1,3,5-Trimethylbenzene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
1,3-Dichlorobenzene (VOAS)	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
1,3-Dichloropropene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
1,4-Dichlorobenzene (VOAS)	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
2,2-Dichloropropane	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
2-Butanone	< 1740	< 1120	< 1900	< 1860	NA	< 1190	< 1730	NA	< 1120	< 880
2-Chloroethyl Vinyl Ether	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
2-Chlortoluene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
2-Hexanone	< 752	< 482	< 823	< 805	NA	< 513	< 745	NA	< 482	< 380
4-Chlortoluene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
4-Methyl-2-pentanone	< 752	< 482	< 823	< 805	NA	< 513	< 745	NA	< 482	< 380
Acetone	< 1740	< 1120	< 1900	< 1860	NA	< 1190	< 1730	NA	< 1120	< 880
Acrolein	< 4950	< 3170	< 5410	< 5300	NA	< 3370	< 4900	NA	< 3170	< 2500
Acrylonitrile	< 2570	< 1650	< 2810	< 2750	NA	< 1750	< 2550	NA	< 1650	< 1300
Allyl Chloride	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Benzene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Bromobenzene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Bromochloromethane	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Bromodichloromethane	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
Bromoform	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Bromomethane	< 752	< 482	< 823	< 805	NA	< 513	< 745	NA	< 482	< 380
Carbon Disulfide	< 752	< 482	< 823	< 805	NA	< 513	< 745	NA	< 482	< 380
Carbon Tetrachloride	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Chlorobenzene	356 J	< 165	< 281	< 275	NA	< 175	1780	NA	< 165	< 130
Chloroethane	< 752	< 482	< 823	< 805	NA	< 513	< 745	NA	< 482	< 380
Chloroform	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Chlormethane	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
Dibromochloromethane	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Dibromomethane	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Dichlorodifluoromethane	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
Ethyl Methacrylate	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Ethylbenzene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Freon 113	< 495	951 JB	< 541	< 530	NA	850 JB	< 490	NA	< 317	< 250
Freon 141b	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Hexachlorobutadiene (VOAS)	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250

TABLE 6-5
Sediment Analytical Results for Beaver Run Lagoon

SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE	SM004-SD05-0001 0.00-1.00 SD05 6/18/1997	SM004-SD05-0405 4.00-5.00 SD05 6/18/1997	SM004-SD06-0001 0.00-1.00 SD06 7/3/1997	SM004-SD06-0001FDC 0.00-1.00 SD06 6/18/1997	SM004-SD06-0001R 0.00-0.00 SD06 2/25/1998	SM004-SD06-0405 4.00-5.00 SD06 6/18/1997	SM004-SD07-0001 0.00-1.00 SD07 6/18/1997	SM004-SD07-0001R 0.00-0.00 SD07 2/25/1998	SM004-SD08 0.00-0.00 SD08 6/19/1997	SM004-SD09 0.00-0.00 SD09 6/18/1997
PARAMETER										
Isopropylbenzene	< 752	< 482	< 823	< 805	NA	< 513	< 745	NA	< 482	< 380
Methyl Iodide	< 752	< 482	< 823	< 805	NA	< 513	< 745	NA	< 482	< 380
Methylene Chloride	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
Naphthalene (VOAS)	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Styrene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Tetrachloroethene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Toluene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Trichloroethene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
Trichlorofluoromethane	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
Vinyl Acetate	< 752	< 482	< 823	< 805	NA	< 513	< 745	NA	< 482	< 380
Vinyl Chloride	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
cis-1,2-Dichloroethene	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
cis-1,3-Dichloropropene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
m+p-Xylene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
n-Butylbenzene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
n-Propylbenzene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
o-Xylene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
p-Isopropyltoluene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
sec-Butylbenzene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
tert-Butylbenzene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
trans-1,2-Dichloroethene	< 495	< 317	< 541	< 530	NA	< 337	< 490	NA	< 317	< 250
trans-1,3-Dichloropropene	< 257	< 165	< 281	< 275	NA	< 175	< 255	NA	< 165	< 130
trans-1,4-Dichloro-2-butene	< 2570	< 1650	< 2810	< 2750	NA	< 1750	< 2550	NA	< 1650	< 1300
Semivolatiles (µg/kg)										
1,2,3-Trichlorobenzene (SVOA)	R	< 390	< 1120	< 1080	< 468	< 870	< 920 J	< 3473	< 390	NA
1,2,4,5-Tetrachlorobenzene	R	< 390	< 1120	< 1080	< 468	< 870	< 920 J	< 3473	< 390	NA
1,2,4-Trichlorobenzene (SVOA)	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
1,2-Dichlorobenzene (SVOA)	R	< 320 J	< 940 J	< 900 J	< 390	1300 J	< 770 J	< 2894	< 320 J	NA
1,3-Dichlorobenzene (SVOA)	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
1,4-Dichlorobenzene (SVOA)	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
1-Chloronaphthalene	R	< 800	< 2340	< 2240	< 975	< 1820	< 1920 J	< 7236	< 800	NA
1-Methylnaphthalene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
1-Naphthylamine	R	< 1090	< 3190	< 3050	< 1326	< 2480	< 2610 J	< 9841	< 1090	NA
2,3,4,6-Tetrachlorophenol	R	< 640	< 1870	< 1800	< 780	< 1460	< 1540 J	< 5789	< 640	NA
2,3-Dichloroaniline	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2,4,5-Trichlorophenol	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2,4,6-Trichlorophenol	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2,4-Dichlorophenol	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2,4-Dimethylphenol	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2,4-Dinitrophenol	R	< 1990	< 5810	< 5570	< 2417	< 4520	< 4770 J	< 17945	< 1990	NA
2,4-Dinitrotoluene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2,4-Toluenediamine	R	< 1610	R	< 4490	< 1949	< 3640	< 3840 J	< 14471	< 1610	NA
2,6-Dichlorophenol	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2,6-Dinitrotoluene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2-Chloronaphthalene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2-Chlorophenol	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2-Methylnaphthalene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2-Naphthylamine	R	< 1220	< 3560	< 3410	< 1481	< 2770	< 2920 J	< 10998	< 1220	NA
2-Nitroaniline	R	< 390	< 1120	< 1080	< 468	< 870	< 920 J	< 3473	< 390	NA
2-Nitrodiphenylamine	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2-Nitrophenol	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
2-Picoline	R	< 1190	< 3470	< 3320	< 1442	< 2700	< 2850 J	< 10709	< 1190	NA
3,3'-Dichlorobenzidine	R	< 1960	< 5720	< 5480	< 2378	< 4440	< 4690 J	< 17655	< 1960	NA
3-Methylcholanthrene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA

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Sediment Analytical Results for Beaver Run Lagoon

SAMPLE ID	SM004-SD05-0001	SM004-SD05-0405	SM004-SD06-0001	SM004-SD06-0001FDC	SM004-SD06-0001R	SM004-SD06-0405	SM004-SD07-0001	SM004-SD07-0001R	SM004-SD08	SM004-SD09
SAMPLE DEPTH(ft)	0.00-1.00	4.00-5.00	0.00-1.00	0.00-1.00	0.00-0.00	4.00-5.00	0.00-1.00	0.00-0.00	0.00-0.00	0.00-0.00
SAMPLE LOCATION	SD05	SD05	SD06	SD06	SD06	SD06	SD07	SD07	SD08	SD09
SAMPLE DATE	6/18/1997	6/18/1997	7/3/1997	6/18/1997	2/25/1998	6/18/1997	6/18/1997	2/25/1998	6/19/1997	6/18/1997
PARAMETER										
3-Nitroaniline	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
4,4' Methyleneedianiline	R	<2830 J	<8250 J	<7900 J	<3431	<6410 J	<6770 J	<25470	<2830 J	NA
4,6-Dinitro-o-cresol	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
4-Aminobiphenyl	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
4-Aminodiphenylamine	R	<800	R	<2240	<975	<1820	<1920 J	<7236	<800	NA
4-Bromophenyl phenyl ether	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
4-Chloro-m-cresol	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
4-Chlorophenylphenyl ether	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
4-Nitroaniline	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
4-Nitrophenol	R	<320 J	<940 J	<900 J	<390	<730 J	<770 J	<2894	<320 J	NA
5-Nitro-o-toluidine	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
7,12-dimethylbenz[a]anthracene	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Acenaphthene	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Acenaphthylene	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Acetophenone	R	<420	<1220	<1170	<507	<950	<1000 J	<3763	<420	NA
Aniline	R	<450 J	<1310 J	<1260 J	<546	1490 J	<1080 J	<4052	<450 J	NA
Anthracene	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Azobenzene	R	<390	<1120	<1080	<468	<870	<920 J	<3473	<390	NA
Benzidine	R	<5140	<15000	<14400	<6238 J	<11700	<12300 J	<46309 J	<5140	NA
Benzo(a)anthracene	R	<420	<1220	<1170	<507	<950	<1000 J	<3763	<420	NA
Benzo(a)pyrene	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Benzo(b)fluoranthene	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Benzo(g/h)perylene	R	<350	<1030	<990	<429	<800	<850 J	<3184	<350	NA
Benzo(k)fluoranthene	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Benzoic Acid	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Benzyl Alcohol	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Benzyl butyl phthalate	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Bis(2-chloroethoxymethane)	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Bis(2-chloroethyl)ether	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Bis(2-chloroisopropyl)ether	R	<320	<940	<900	<390 J	<730	<770 J	<2894 J	<320	NA
Bis(2-ethylhexyl) phthalate	2860 JB	<390	<1120	3350	1559 JB	1530 B	1040 JB	<3473 J	680 B	NA
Bisphenol A	18100 J	5110 J	<1690 J	66400 J	2827 J	3680 J	<1380 J	<5210 J	<580 J	NA
Carbazole	R	<1610	<4690	<4490	<1949	<3640	<3840 J	<14471	<1610	NA
Chrysene	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Cyclohexanone	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Di-n-butyl phthalate	14400 JB	6140 B	940 B	34000	29434 B	8810 B	2650 JB	5065 B	12400 B	NA
Di-n-octyl phthalate	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Dibenzo(a,h)anthracene	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Dibenzo furan	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Diethyl Phthalate	R	<320	<940	<900	464	<730	<770 J	<2894	<320	NA
Dimethylphthalate	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Ethyl Methane Sulfonate	R	<580	<1690	<1620	<702	<1310	<1380 J	<5210	<580	NA
Fluoranthene	R	<320	<940	<900	<390	<730	<770 J	<2894	<320	NA
Fluorene	R	<320 J	<940 J	<900 J	<390	<730 J	<770 J	<2894	<320 J	NA
Heptachlor	R	<350	<1030	<990	<429	<800	<850 J	<3184	<350	NA

TABLE 6-5
Sediment Analytical Results for Beaver Run Lagoon

SAMPLE ID	SM004-SD05-0001	SM004-SD05-0405	SM004-SD06-0001	SM004-SD06-0001FDC	SM004-SD06-0001R	SM004-SD06-0405	SM004-SD07-0001	SM004-SD07-0001R	SM004-SD08	SM004-SD09
SAMPLE DEPTH(ft)	0.00-1.00	4.00-5.00	0.00-1.00	0.00-1.00	0.00-0.00	4.00-5.00	0.00-1.00	0.00-0.00	0.00-0.00	0.00-0.00
SAMPLE LOCATION	SD05	SD05	SD06	SD06	SD06	SD06	SD07	SD07	SD08	SD09
SAMPLE DATE	6/18/1997	6/18/1997	7/3/1997	6/18/1997	2/25/1998	6/18/1997	6/18/1997	2/25/1998	6/19/1997	6/18/1997
PARAMETER										
Hexachlorobenzene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Hexachlorobutadiene (SVOA)	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Hexachlorocyclopentadiene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Hexachloroethane	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Indeno(1,2,3-cd)pyrene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Isophorone	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Methyl methane sulfonate	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
N-Nitrosodibutylamine	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
N-Nitrosodimethylamine	R	< 320 J	< 940 J	< 900 J	< 390	< 730 J	< 770 J	< 2894	< 320 J	NA
N-Nitrosodiphenylamine	R	< 420	< 1220	< 1170	< 507	< 950	< 1000 J	< 3763	< 420	NA
N-Nitrosodipropylamine	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
N-Nitrosopiperidine	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Naphthalene (SVOA)	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Nitrobenzene	R	< 320	< 940	< 900	< 390	< 730	1090 J	< 2894	< 320	NA
Pentachlorobenzene	R	< 550	< 1590	< 1530	< 663	< 1240	< 1310 J	< 4920	< 550	NA
Pentachloronitrobenzene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Pentachlorophenol	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Phenacetin	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Phenanthrene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Phenol	R	< 190 J	< 560 J	< 540 J	< 234	< 440 J	< 460 J	< 1737	< 190 J	NA
Pyrene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Pyridine	R	< 350	< 1030	< 990	< 429	< 800	< 850 J	< 3184	< 350	NA
Trimethylphosphate	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
Triphenylphosphate	R	< 1610	< 4690	< 4490	< 1949	< 3640	< 3840 J	< 14471	< 1610	NA
m,p-Cresol	R	< 480 J	< 1410 J	< 1350 J	< 585	< 1090 J	< 1150 J	< 4342	< 480 J	NA
m-Nitrotoluene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
m-Toluidine	R	< 640	< 1870	< 1800	< 780	< 1460	< 1540 J	< 5789	< 640	NA
o,p-Toluidine	R	< 1640 J	< 4780 J	< 4580 J	< 1988	< 3720 J	< 3920 J	< 14761	< 1640 J	NA
o-Cresol	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
o-Nitrotoluene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
p-Chloroaniline	R	< 320	< 940	< 900	< 390	5830	< 770 J	< 2894	< 320	NA
p-Dimethylaminoazobenzene	R	< 320	< 940	< 900	< 390	< 730	< 770 J	< 2894	< 320	NA
p-Nitrotoluene	R	< 480	< 1410	< 1350	< 585	< 1090	< 1150 J	< 4342	< 480	NA
Metals (µg/kg)										
Antimony	< 792	< 507	< 866	< 847	NA	< 540	< 784	NA	< 507	NA
Cadmium	< 790	940 J	1690 J	1400 J	NA	900 J	< 780	NA	1080 J	NA
Chromium	25800 J	16290 J	52990 J	39620 J	NA	31550 J	19630 J	NA	17110 J	NA
Lead	21257 J	17114 J	24866 J	25917 J	NA	19482 J	23051 J	NA	15521 J	NA
Nickel	34950 J	21140 J	77750 J	56780 J	NA	30970 J	22310 J	NA	20000 J	NA
Miscellaneous (µg/kg)										
Percent Moisture	50 %	21 %	54 %	53 %	49 %	26 %	49 %	31 %	21 %	NA
Total Organic Carbon	9900000	3700000	1520000	5400000	NA	3800000	2200000	NA	NA	NA
pH in Water (Solid Sample)	6.7 std	6.4 std	6.7 std	6.9 std	NA	6.6 std	NA	NA	NA	NA

B=Blank Contamination

J=Estimated Value

NA=Not Analyzed

R=Data Rejected For Quality Reason

LE 6-6
Comparison to Risk-Based Criteria
SWMU 4: Beaver Run Lagoon – Sediments

Constituent	Maximum Detected Concentration (mg/kg) ⁽¹⁾	Maximum Detection Limit for Non-Detects (mg/kg)	Frequency of Detection	EPA Region III Risk-Based Concentrations for Soil (mg/kg)		Ecological SQC (mg/kg)	Maximum Detection Exceeds Criteria	Maximum Detection Limit for Non-Detects Exceeds Criteria
				Industrial	Residential			
MISCELLANEOUS								
pH in Water (Solid Sample)	6.96	NA	12 / 12	--	--	--	No	No
Total Organic Carbon	25900	NA	13 / 13	--	--	--	No	No
METALS								
Cadmium	4.78 J	< 0.95	10 / 14	1000	39	1.2 ²	> ECO	No
Chromium	88.2 J	NA	14 / 14	10000	390	81 ²	> ECO	No
Lead	169 J	NA	14 / 14	400	200	47 ²	> ECO	No
Nickel	113 J	NA	14 / 14	41000	1600	21 ²	> ECO	No
VOLATILES								
1,1,2,2-Tetrachloroethane	ND	< 0.34	0 / 15	29	3.2	0.94 ³	No	No
1,1,2-Trichloroethane	ND	< 0.66	0 / 15	100	11	1.2 ³	No	No
1,1-Dichloroethene	ND	< 0.66	0 / 15	9.5	1.1	0.031 ⁴	No	No
1,2,3-Trichloropropane	ND	< 0.34	0 / 15	0.82	0.091	--	No	> RES
1,2-Dibromo-3-chloropropane	ND	< 0.66	0 / 15	4.1	0.46	--	No	> RES
1,2-Dibromoethane	ND	< 0.34	0 / 15	0.067	0.0075	--	No	> IND, RES
1,2-Dichloroethane	ND	< 0.66	0 / 15	63	7	0.26 ⁴	No	No
1,2-Dichloropropane	ND	< 1.01	0 / 15	84	9.4	--	No	No
Acetone	ND	< 2.33	0 / 15	200000	7800	0.0088 ⁴	No	No
Acrylonitrile	ND	< 3.44	0 / 15	11	1.2	--	No	> RES
Benzene	ND	< 0.34	0 / 15	200	22	0.057 ³	No	> ECO
Bromodichloromethane	ND	< 0.66	0 / 15	92	10	--	No	No
Bromomethane	ND	< 1.01	0 / 15	2900	110	--	No	No
Carbon Tetrachloride	ND	< 0.34	0 / 15	44	4.9	0.048 ⁴	No	No
Chlorobenzene	4.37	< 0.28	9 / 15	41000	1600	0.82 ³	> ECO	No
cis-1,2-Dichloroethene	ND	< 0.66	0 / 15	20000	780	0.40 ⁴	No	No
cis-1,3-Dichloropropene	ND	< 0.34	0 / 15	33	3.7	0.051 ⁴	No	No
Freon 113	0.95 JB	< 0.66	2 / 15	410000	16000	--	No	No
Methylene Chloride	ND	< 0.66	0 / 15	760	85	0.38 ⁴	No	No
Tetrachloroethene	ND	< 0.34	0 / 15	110	12	0.53 ³	No	No
trans-1,3-Dichloropropene	ND	< 0.34	0 / 15	33	3.7	0.051 ⁴	No	No
Trichloroethene	ND	< 0.34	0 / 15	520	58	1.6 ³	No	No
Vinyl Chloride	ND	< 0.66	0 / 15	3	0.34	--	No	> RES
SEMITOTALS								
1,2-Dichlorobenzene	3.89 J	< 2.89	2 / 14	180000	7000	0.34 ³	> ECO	No
1-Naphthylamine	ND	< 9.84	0 / 14	0.044	0.0049	--	No	> IND, RES
2,4,6-Trichlorophenol	ND	< 2.89	0 / 13	520	58	--	No	No
2,4-Dichlorophenol	ND	< 2.89	0 / 13	6100	230	--	No	No
2,4-Dinitrophenol	ND	< 18.0	0 / 13	4100	160	--	No	No
2,4-Dinitrotoluene	ND	< 2.89	0 / 14	4100	160	--	No	No
2,4-Toluenediamine	ND	< 14.5	0 / 13	1.8	0.2	--	No	> IND, RES
2,6-Dinitrotoluene	ND	< 2.89	0 / 14	2000	78	--	No	No
2-Naphthylamine	ND	< 11.0	0 / 14	0.044	0.0049	--	No	> IND, RES
3,3'-Dichlorobenzidine	ND	< 17.7	0 / 14	13	1.4	--	No	> IND, RES
Aniline	1.49 J	< 4.05	1 / 14	1000	110	--	No	No

TABLE 6-6
Comparison to Risk-Based Criteria
SWMU 4: Beaver Run Lagoon -- Sediments

Constituent	Maximum Detected Concentration (mg/kg) ⁽¹⁾	Maximum Detection Limit for Non-Detects (mg/kg)	Frequency of Detection	EPA Region III Risk-Based Concentrations for Soil (mg/kg)		Ecological SQC (mg/kg)	Maximum Detection Exceeds Criteria	Maximum Detection Limit for Non-Detects Exceeds Criteria
				Industrial	Residential			
Benzidine	ND	< 46.3	0 / 14	0.025	0.0028	0.0017 ⁴	No	> IND, RES
Benzo(a)anthracene	ND	< 3.76	0 / 14	7.8	0.88	0.11 ⁴	No	> RES
Benzo(a)pyrene	ND	< 2.89	0 / 14	0.78	0.088	0.43 ²	No	> IND, RES
Benzo(b)fluoranthene	ND	< 2.89	0 / 14	7.8	0.88	--	No	> RES
Benzyl Alcohol	4.06	< 2.89	1 / 13	610000	23000	--	No	No
Bis(2-chloroethyl)ether	ND	< 2.89	0 / 14	5.2	0.58	--	No	> RES
Bis(2-ethylhexyl) phthalate	7.49 B	< 3.47	12 / 16	410	46	890 ⁴	No	No
Bisphenol A	66.4	< 5.21	12 / 16	100000	3900	--	No	No
Carbazole	ND	< 14.5	0 / 14	290	32	--	No	No
Di-n-butyl phthalate	108 B	NA	17 / 17	200000	7800	12 ⁴	> ECO	No
Dibenzo(a,h)anthracene	ND	< 2.89	0 / 14	0.78	0.088	--	No	> IND, RES
Diethyl Phthalate	0.46	< 2.89	1 / 14	1000000	63000	0.63 ³	No	No
Heptachlor	ND	< 3.18	0 / 14	1.3	0.14	0.069 ⁴	No	> IND, RES
Hexachlorobenzene	ND	< 2.89	0 / 14	3.6	0.4	--	No	> RES
Hexachloroethane	ND	< 2.89	0 / 14	410	46	1.0	No	No
Indeno(1,2,3-cd)pyrene	ND	< 2.89	0 / 14	7.8	0.88	--	No	> RES
Isophorone	ND	< 2.89	0 / 14	6000	670	--	No	No
m-Toluidine	ND	< 5.79	0 / 14	30	3.4	--	No	> RES
N-Nitrosodibutylamine	ND	< 2.89	0 / 14	1.1	0.12	--	No	> IND, RES
N-Nitrosodimethylamine	ND	< 2.89	0 / 14	0.11	0.013	--	No	> IND, RES
N-Nitrosodiphenylamine	ND	< 2.89	0 / 14	1200	130	--	No	No
N-Nitrosodipropylamine	ND	< 2.89	0 / 14	0.82	0.091	--	No	> IND, RES
Nitrobenzene	1.09 J	< 2.89	1 / 14	1000	39	--	No	No
o,p-Toluidine	ND	< 14.8	0 / 14	30	3.4	--	No	> RES
p-Chloroaniline	5.83	< 2.89	1 / 14	8200	310	--	No	No
Pentachloronitrobenzene	ND	< 2.89	0 / 14	22	2.5	--	No	> RES
Pentachlorophenol	ND	< 2.89	0 / 13	48	5.3	--	No	No

NA - Not applicable.

"J" - Estimated value.

ND - Not detected.

"B" - Blank contamination.

(1) "mg/kg" - Units reported in milligrams per kilogram (equivalent to parts per million) unless otherwise noted.

(2) ER-L from Long et al. (1995)

(3) SQB based on Tier II value from USEPA (1996)

(4) Sediment criterion based on Tier II value from Jones et al. (1996)

-- - Value not available for this constituent.

TABLE 6-7
Surface Water Analytical Results for Beaver Run Lagoon

SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE	SM004-SW01 0.00-0.00 SW01 6/17/1997	SM004-SW02 0.00-0.00 SW02 6/17/1997	SM004-SW02FDA 0.00-0.00 SW02 6/17/1997	SM004-SW03 0.00-0.00 SW03 6/17/1997	SM004-SW04 0.00-0.00 SW04 6/17/1997	SM004-SW05 0.00-0.00 SW05 6/17/1997
PARAMETER						
Volatiles ($\mu\text{g/L}$)						
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	< 2	< 2	< 2	< 2	< 2	< 2
1,1,2-Trichloroethane	< 2	< 2	< 2	< 2	< 2	< 2
1,1-Dichloroethane	< 2	< 2	< 2	< 2	< 2	< 2
1,1-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene (VOAS)	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichloropropane	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-Trichlorobenzene (VOAS)	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dibromo-3-chloropropane	< 3	< 3	< 3	< 3	< 3	< 3
1,2-Dibromoethane	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichlorobenzene (VOAS)	< 2	< 2	< 2	< 2	< 2	< 2
1,2-Dichloroethane	< 2	< 2	< 2	< 2	< 2	< 2
1,2-Dichloropropane	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene (VOAS)	< 2	< 2	< 2	< 2	< 2	< 2
1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene (VOAS)	< 2	< 2	< 2	< 2	< 2	< 2
2,2-Dichloropropane	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	< 3	< 3	< 3	< 3	< 3	< 3
2-Chloroethyl Vinyl Ether	R	R	R	R	R	R
2-Chlorotoluene	< 1	< 1	< 1	< 1	< 1	< 1
2-Hexanone	< 7	< 7	< 7	< 7	< 7	< 7
4-Chlorotoluene	< 1	< 1	< 1	< 1	< 1	< 1
4-Methyl-2-pentanone	< 5	< 5	< 5	< 5	< 5	< 5
Acetone	< 6	< 6	< 6	< 6	< 6	< 6
Acrolein	< 40	< 40	< 40	< 40	< 40	< 40
Acrylonitrile	< 10	< 10	< 10	< 10	< 10	< 10
Allyl Chloride	< 1	< 1	< 1	< 1	< 1	< 1
Benzene	< 1	< 1	< 1	< 1	< 1	< 1
Bromobenzene	< 1	< 1	< 1	< 1	< 1	< 1
Bromochloromethane	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	< 3	< 3	8	< 3	< 3	10
Carbon Tetrachloride	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	< 3	< 3	< 3	< 3	< 3	< 3
Chloroform	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	< 3	< 3	< 3	< 3	< 3	< 3
Dibromochloromethane	< 2	< 2	< 2	< 2	< 2	< 2
Dibromomethane	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane	< 2	< 2	< 2	< 2	< 2	< 2
Ethyl Methacrylate	< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	< 2	< 2	< 2	< 2	< 2	< 2
Freon 113	< 2	< 2	2 JB	< 2	< 2	< 2
Freon 141b	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene (VOAS)	< 2	< 2	< 2	< 2	< 2	< 2
Isopropylbenzene	< 2	< 2	< 2	< 2	< 2	< 2
Methyl Iodide	< 1	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	< 2	< 2	< 2	< 2	< 2	< 2
Naphthalene (VOAS)	< 1	< 1	1 J	1 J	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	< 2	< 2	< 2	< 2	< 2	< 2
Trichloroethene	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	< 2	< 2	< 2	< 2	< 2	< 2
Vinyl Acetate	< 2	< 2	2 J	< 2	< 2	< 2
Vinyl Chloride	< 2	< 2	< 2	< 2	< 2	< 2
cis-1,2-Dichloroethene	< 2	< 2	< 2	< 2	< 2	< 2
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1
m+p-Xylene	< 1	< 1	< 1	< 1	< 1	< 1
n-Butylbenzene	< 1	< 1	< 1	< 1	< 1	< 1

TABLE 6-7
Surface Water Analytical Results for Beaver Run Lagoon

SAMPLE ID	SM004-SW01	SM004-SW02	SM004-SW02FDA	SM004-SW03	SM004-SW04	SM004-SW05
SAMPLE DEPTH(ft)	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00
SAMPLE LOCATION	SW01	SW02	SW02	SW03	SW04	SW05
SAMPLE DATE	6/17/1997	6/17/1997	6/17/1997	6/17/1997	6/17/1997	6/17/1997
PARAMETER						
n-Propylbenzene	<1	<1	<1	<1	<1	<1
o-Xylene	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	<2	<2	<2	<2	<2	<2
trans-1,3-Dichloropropene	<1	<1	<1	<1	<1	<1
trans-1,4-Dichloro-2-butene	<15	<15	<15	<15	<15	<15
Semivolatiles (μ g/L)						
1,2,3-Trichlorobenzene (SVOA)	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
1,2,4,5-Tetrachlorobenzene	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
1,2,4-Trichlorobenzene (SVOA)	<2	<2	<2	<2	<2	<2
1,2-Dichlorobenzene (SVOA)	<2 J	<2 J	<2 J	<2 J	<2 J	<2 J
1,3-Dichlorobenzene (SVOA)	<2	<2	<2	<2	<2	<2
1,4-Dichlorobenzene (SVOA)	<2	<2	<2	<2	<2	<2
1-Chloronaphthalene	<5	<5	<5	<5	<5	<5
1-Methylnaphthalene	<2	<2	<2	<2	<2	<2
1-Naphthylamine	<6.8	<6.8	<6.8	<6.8	<6.8	<6.8
2,3,4,6-Tetrachlorophenol	<4	<4	<4	<4	<4	<4
2,3-Dichloroaniline	<2	<2	<2	<2	<2	<2
2,4,5-Trichlorophenol	<2	<2	<2	<2	<2	<2
2,4,6-Trichlorophenol	<2	<2	<2	<2	<2	<2
2,4-Dichlorophenol	<2	<2	<2	<2	<2	<2
2,4-Dimethylphenol	<2	<2	<2	<2	<2	<2
2,4-Dinitrophenol	<12	<12	<12	<12	<12	<12
2,4-Dinitrotoluene	<2	<2	<2	<2	<2	<2
2,4-Toluenediamine	<10	<10	<10	<10	<10	<10
2,6-Dichlorophenol	<2	<2	<2	<2	<2	<2
2,6-Dinitrotoluene	<2	<2	<2	<2	<2	<2
2-Chloronaphthalene	<2	<2	<2	<2	<2	<2
2-Chlorophenol	<2	<2	<2	<2	<2	<2
2-Methylnaphthalene	<2	<2	<2	<2	<2	<2
2-Naphthylamine	<7.6	<7.6	<7.6	<7.6	<7.6	<7.6
2-Nitroaniline	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
2-Nitrodiphenylamine	<2	<2	<2	<2	<2	<2
2-Nitrophenol	<2	<2	<2	<2	<2	<2
2-Picoline	<7.4	<7.4	<7.4	<7.4	<7.4	<7.4
3,3'-Dichlorobenzidine	<12	<12	<12	<12	<12	<12
3-Methylcholanthrene	<2	<2	<2	<2	<2	<2
3-Nitroaniline	<2	<2	<2	<2	<2	<2
4,4' Methyleneedianiline	<18 J	<18 J	<18 J	<18 J	<18 J	<18 J
4,6-Dinitro-o-cresol	<2	<2	<2	<2	<2	<2
4-Aminobiphenyl	<2	<2	<2	<2	<2	<2
4-Aminodiphenylamine	<5	<5	<5	<5	<5	<5
4-Bromophenyl phenyl ether	<2	<2	<2	<2	<2	<2
4-Chloro-m-cresol	<2	<2	<2	<2	<2	<2
4-Chlorophenylphenyl ether	<2	<2	<2	<2	<2	<2
4-Nitroaniline	<2	<2	<2	<2	<2	<2
4-Nitrophenol	<2 J	<2 J	<2 J	<2 J	<2 J	<2 J
5-Nitro-o-toluidine	<2	<2	<2	<2	<2	<2
7,12-dimethylbenz[a]anthracene	<2	<2	<2	<2	<2	<2
Acenaphthene	<2	<2	<2	<2	<2	<2
Acenaphthylene	<2	<2	<2	<2	<2	<2
Acetophenone	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6
Aniline	<2.8 J	<2.8 J	<2.8 J	<2.8 J	<2.8 J	<2.8 J
Anthracene	<2	<2	<2	<2	<2	<2
Azobenzene	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
Benzidine	<32	<32	<32	<32	<32	<32
Benzo(a)anthracene	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6
Benzo(a)pyrene	<2	<2	<2	<2	<2	<2
Benzo(b)fluoranthene	<2	<2	<2	<2	<2	<2
Benzo(ghi)perylene	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
Benzo(k)fluoranthene	<2	<2	<2	<2	<2	<2

TABLE 6-7
Surface Water Analytical Results for Beaver Run Lagoon

SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE	SM004-SW01 0.00-0.00 SW01 6/17/1997	SM004-SW02 0.00-0.00 SW02 6/17/1997	SM004-SW02FDA 0.00-0.00 SW02 6/17/1997	SM004-SW03 0.00-0.00 SW03 6/17/1997	SM004-SW04 0.00-0.00 SW04 6/17/1997	SM004-SW05 0.00-0.00 SW05 6/17/1997
PARAMETER						
Benzoic Acid	<2	<2	<2	<2	<2	<2
Benzyl Alcohol	<2	<2	<2	<2	<2	<2
Benzyl butyl phthalate	<2	<2	<2	<2	<2	<2
Bis(2-chloroethyl)methane)	<2	<2	<2	<2	<2	<2
Bis(2-chloroethyl)ether	<2	<2	<2	<2	<2	<2
Bis(2-chloroisopropyl)ether	<2	<2	<2	<2	<2	<2
Bis(2-ethylhexyl) phthalate	<2.4	3.2	3	2.6	4.7	<2.4
Bisphenol A	30 J	<3.6 J	<3.6 J	<3.6 J	<3.6 J	<3.6 J
Carbazole	<10	<10	<10	<10	<10	<10
Chrysene	<2	<2	<2	<2	<2	<2
Cyclohexanone	<2	<2	<2	<2	<2	<2
Di-n-butyl phthalate	<2	<2	<2	<2	<2	<2
Di-n-octyl phthalate	<2	<2	<2	<2	<2	<2
Dibenzo(a,h)anthracene	<2	<2	<2	<2	<2	<2
Dibenzofuran	<2	<2	<2	<2	<2	<2
Diethyl Phthalate	<2	<2	<2	<2	<2	<2
Dimethylphthalate	<2	<2	<2	<2	<2	<2
Ethyl Methane Sulfonate	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6
Fluoranthene	<2	<2	<2	<2	<2	<2
Fluorene	<2 J	<2 J	<2 J	<2 J	<2 J	<2 J
Heptachlor	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
Hexachlorobenzene	<2	<2	<2	<2	<2	<2
Hexachlorobutadiene (SVOA)	<2	<2	<2	<2	<2	<2
Hexachlorocyclopentadiene	<2	<2	<2	<2	<2	<2
Hexachloroethane	<2	<2	<2	<2	<2	<2
Indeno(1,2,3-cd)pyrene	<2	<2	<2	<2	<2	<2
Isophorone	<2	<2	<2	<2	<2	<2
Methyl methane sulfonate	<2	<2	<2	<2	<2	<2
N-Nitrosodibutylamine	<2	<2	<2	<2	<2	<2
N-Nitrosodimethylamine	<2 J	<2 J	<2 J	<2 J	<2 J	<2 J
N-Nitrosodiphenylamine	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6
N-Nitrosodipropylamine	<2	<2	<2	<2	<2	<2
N-Nitrosopiperidine	<2	<2	<2	<2	<2	<2
Naphthalene (SVOA)	<2	<2	<2	<2	<2	<2
Nitrobenzene	<2	<2	<2	<2	<2	<2
Pentachlorobenzene	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4
Pentachloronitrobenzene	<2	<2	<2	<2	<2	<2
Pentachlorophenol	<2	<2	<2	<2	<2	<2
Phenacetin	<2	<2	<2	<2	<2	<2
Phenanthrene	<2	<2	<2	<2	<2	<2
Phenol	<1.2 J	<1.2 J	<1.2 J	<1.2 J	<1.2 J	<1.2 J
Pyrene	<2	<2	<2	<2	<2	<2
Pyridine	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
Trimethylphosphate	<2	<2	<2	<2	<2	<2
Triphenylphosphate	<10	<10	<10	<10	<10	<10
m,p-Cresol	<3 J	<3 J	<3 J	<3 J	<3 J	<3 J
m-Nitrotoluene	<2	<2	<2	<2	<2	<2
m-Toluidine	<4	<4	<4	<4	<4	<4
o,p-Toluidine	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J
o-Cresol	<2	<2	<2	<2	<2	<2
o-Nitrotoluene	<2	<2	<2	<2	<2	<2
p-Chloroaniline	<2	<2	<2	<2	<2	<2
p-Dimethylaminoazobenzene	<2	<2	<2	<2	<2	<2
p-Nitrotoluene	<3	<3	<3	<3	<3	<3
Metals (µg/L)						
Antimony	<4	<4	<4	<4	<4	<4
Cadmium	<4	<4	<4	<4	<4	<4
Chromium	<3	<3	<3	<3	<3	<3
Lead	<4	<4	<4	<4	<4	<4
Nickel	10 JB	<4	<4	<4	<4	<4
Miscellaneous (µg/L)						
Total Organic Carbon	5310	5690	5600	5460	5800	5540
Biological Oxygen Demand	<2000	<2000	<2000	<2000	<2000	<2000
Chemical Oxygen Demand (low)	6920 J	<5000	<5000	<5000	<5000	<5000
Nitrate	930 J	980 J	960 J	<10	980 J	980 J
Nitrite	<400	<400	<400	<400	<400	<400
Oil & Grease	<5000	<5000	<5000	<5000	9510 J	<5000
Total Dissolved Solids	291000 J	268000 J	259000 J	280000 J	262000 J	274000 J
Total Kjeldahl Nitrogen	4040 J	1450 J	4450 J	2870 J	2580 J	1150 J
Total Suspended Solids	14500 J	12000 J	10500 J	35500 J	4500 J	11000 J
pH	7.9 J std	8.1 J std	8.1 J std	8 J std	8 J std	7.9 J std

B=Blank Contamination

J=Estimated Value

NA=Not Analyzed

R=Data Rejected for Quality Reasons

TABLE 6-7
Surface Water Analytical Results for Beaver Run Lagoon

SAMPLE ID	SM004-SW06	SM004-SW06R	SM004-SW07	SM004-SW08	SM004-SW09
SAMPLE DEPTH(ft)	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00
SAMPLE LOCATION	SW06	SW06	SW07	SW08	SW09
SAMPLE DATE	6/17/1997	/ /	6/17/1997	6/17/1997	6/17/1997
PARAMETER					
Volatiles (µg/L)					
1,1,1,2-Tetrachloroethane	< 1	NA	< 1	< 1	< 1
1,1,1-Trichloroethane	< 1	NA	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	< 2	NA	< 2	< 2	< 2
1,1,2-Trichloroethane	< 2	NA	< 2	< 2	< 2
1,1-Dichloroethane	< 2	NA	< 2	< 2	< 2
1,1-Dichloroethene	< 1	NA	< 1	< 1	< 1
1,1-Dichloropropene	< 1	NA	< 1	< 1	< 1
1,2,3-Trichlorobenzene (VOAS)	< 1	NA	< 1	< 1	< 1
1,2,3-Trichloropropane	< 1	NA	< 1	< 1	< 1
1,2,4-Trichlorobenzene (VOAS)	< 1	NA	< 1	< 1	< 1
1,2,4-Trimethylbenzene	< 1	NA	< 1	< 1	< 1
1,2-Dibromo-3-chloropropane	< 3	NA	< 3	< 3	< 3
1,2-Dibromoethane	< 1	NA	< 1	< 1	< 1
1,2-Dichlorobenzene (VOAS)	< 2	NA	< 2	< 2	< 2
1,2-Dichloroethane	< 2	NA	< 2	< 2	< 2
1,2-Dichloropropene	< 1	NA	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	NA	< 1	< 1	< 1
1,3-Dichlorobenzene (VOAS)	< 2	NA	< 2	< 2	< 2
1,3-Dichloropropane	< 1	NA	< 1	< 1	< 1
1,4-Dichlorobenzene (VOAS)	< 2	NA	< 2	< 2	< 2
2,2-Dichloropropane	< 1	NA	< 1	< 1	< 1
2-Butanone	< 3	NA	< 3	< 3	< 3
2-Chloroethyl Vinyl Ether	R	NA	R	R	R
2-Chlorotoluene	< 1	NA	< 1	< 1	< 1
2-Hexanone	< 7	NA	< 7	< 7	< 7
4-Chlorotoluene	< 1	NA	< 1	< 1	< 1
4-Methyl-2-pentanone	< 5	NA	< 5	< 5	< 5
Acetone	< 6	NA	< 6	< 6	< 6
Acrolein	< 40	NA	< 40	< 40	< 40
Acrylonitrile	< 10	NA	< 10	< 10	< 10
Allyl Chloride	< 1	NA	< 1	< 1	< 1
Benzene	< 1	NA	< 1	< 1	< 1
Bromobenzene	< 1	NA	< 1	< 1	< 1
Bromochloromethane	< 1	NA	< 1	< 1	< 1
Bromodichloromethane	< 1	NA	< 1	< 1	< 1
Bromoform	< 1	NA	< 1	< 1	< 1
Bromomethane	< 3	NA	< 3	< 3	< 3
Carbon Disulfide	< 3	NA	290	12	< 3
Carbon Tetrachloride	< 1	NA	< 1	< 1	< 1
Chlorobenzene	< 1	NA	< 1	< 1	< 1
Chloroethane	< 3	NA	< 3	< 3	< 3
Chloroform	< 1	NA	< 1	< 1	< 1
Chloromethane	< 3	NA	< 3	< 3	< 3
Dibromo-chloromethane	< 2	NA	< 2	< 2	< 2
Dibromomethane	< 1	NA	< 1	< 1	< 1
Dichlorodifluoromethane	< 2	NA	< 2	< 2	< 2
Ethyl Methacrylate	< 1	NA	< 1	< 1	< 1
Ethylbenzene	< 2	NA	< 2	< 2	< 2
Freon 113	4 JB	NA	< 2	< 2	< 2
Freon 141b	< 1	NA	< 1	< 1	< 1
Hexachlorobutadiene (VOAS)	< 2	NA	< 2	< 2	< 2
Isopropylbenzene	< 2	NA	< 2	< 2	< 2
Methyl Iodide	< 1	NA	< 1	< 1	< 1
Methylene Chloride	< 2	NA	< 2	< 2	< 2
Naphthalene (VOAS)	< 1	NA	< 1	< 1	< 1
Styrene	< 1	NA	< 1	< 1	< 1
Tetrachloroethene	< 1	NA	< 1	< 1	< 1
Toluene	< 2	NA	< 2	< 2	< 2
Trichloroethene	< 1	NA	< 1	< 1	< 1
Trichlorofluoromethane	< 2	NA	< 2	< 2	< 2
Vinyl Acetate	< 2	NA	< 2	< 2	< 2
Vinyl Chloride	< 2	NA	< 2	< 2	< 2
cis-1,2-Dichloroethene	< 2	NA	< 2	< 2	< 2
cis-1,3-Dichloropropene	< 1	NA	< 1	< 1	< 1
m+p-Xylene	< 1	NA	< 1	< 1	< 1
n-Butylbenzene	< 1	NA	< 1	< 1	< 1

TABLE 6-7
Surface Water Analytical Results for Beaver Run Lagoon

SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE	SM004-SW06 0.00-0.00 SW06 6/17/1997	SM004-SW06R 0.00-0.00 SW06 //	SM004-SW07 0.00-0.00 SW07 6/17/1997	SM004-SW08 0.00-0.00 SW08 6/17/1997	SM004-SW09 0.00-0.00 SW09 6/17/1997
PARAMETER					
n-Propylbenzene	< 1	NA	< 1	< 1	< 1
o-Xylene	< 1	NA	< 1	< 1	< 1
p-Isopropyltoluene	< 1	NA	< 1	< 1	< 1
sec-Butylbenzene	< 1	NA	< 1	< 1	< 1
tert-Butylbenzene	< 1	NA	< 1	< 1	< 1
trans-1,2-Dichloroethene	< 2	NA	< 2	< 2	< 2
trans-1,3-Dichloropropene	< 1	NA	< 1	< 1	< 1
trans-1,4-Dichloro-2-butene	< 15	NA	< 15	< 15	< 15
Semivolatiles (µg/L)					
1,2,3-Trichlorobenzene (SVOA)	< 2.4 J	< 3	< 2.4	< 2.4	< 2.4
1,2,4,5-Tetrachlorobenzene	< 2.4 J	< 3	< 2.4	< 2.4	< 2.4
1,2,4-Trichlorobenzene (SVOA)	< 2 J	< 2.5	< 2	< 2	< 2
1,2-Dichlorobenzene (SVOA)	< 65 J	< 2.5	< 2 J	< 2 J	< 2 J
1,3-Dichlorobenzene (SVOA)	< 2 J	< 2.5	< 2	< 2	< 2
1,4-Dichlorobenzene (SVOA)	< 2 J	< 2.5	< 2	< 2	< 2
1-Chloronaphthalene	< 5 J	< 6.2	< 5	< 5	< 5
1-Methylnaphthalene	< 2 J	< 2.5	< 2	< 2	< 2
1-Naphthylamine	< 6.8 J	< 8.4	< 6.8	< 6.8	< 6.8
2,3,4,6-Tetrachlorophenol	< 4 J	< 5	< 4	< 4	< 4
2,3-Dichloroaniline	< 2 J	< 2.5	< 2	< 2	< 2
2,4,5-Trichlorophenol	< 2 J	< 2.5	< 2	< 2	< 2
2,4,6-Trichlorophenol	< 2 J	< 2.5	< 2	< 2	< 2
2,4-Dichlorophenol	< 2 J	< 2.5	< 2	< 2	< 2
2,4-Dimethylphenol	< 2 J	< 2.5	< 2	< 2	< 2
2,4-Dinitrophenol	< 12 J	< 15	< 12	< 12	< 12
2,4-Dinitrotoluene	< 2 J	< 2.5	< 2	< 2	< 2
2,4-Toluenediamine	< 10 J	< 12	< 10	< 10	< 10
2,6-Dichlorophenol	< 2 J	< 2.5	< 2	< 2	< 2
2,6-Dinitrotoluene	< 2 J	< 2.5	< 2	< 2	< 2
2-Chloronaphthalene	< 2 J	< 2.5	< 2	< 2	< 2
2-Chlorophenol	< 2 J	< 2.5	< 2	< 2	< 2
2-Methylnaphthalene	< 2 J	< 2.5	< 2	< 2	< 2
2-Naphthylamine	< 7.6 J	< 9.4	< 7.6	< 7.6	< 7.6
2-Nitroaniline	< 2.4 J	< 3	< 2.4	< 2.4	< 2.4
2-Nitrodiphenylamine	< 2 J	< 2.5	< 2	< 2	< 2
2-Nitrophenol	< 2 J	< 2.5	< 2	< 2	< 2
2-Picoline	< 7.4 J	< 9.2	< 7.4	< 7.4	< 7.4
3,3'-Dichlorobenzidine	< 12 J	< 15	< 12	< 12	< 12
3-Methylcholanthrene	< 2 J	< 2.5	< 2	< 2	< 2
3-Nitroaniline	< 2 J	< 2.5	< 2	< 2	< 2
4,4'-Methylenedianiline	< 18 J	< 22	< 18 J	< 18 J	< 18 J
4,6-Dinitro-o-cresol	< 2 J	< 2.5	< 2	< 2	< 2
4-Aminobiphenyl	< 2 J	< 2.5	< 2	< 2	< 2
4-Aminodiphenylamine	< 5 J	< 6.2	< 5	< 5	< 5
4-Bromophenyl phenyl ether	< 2 J	< 2.5	< 2	< 2	< 2
4-Chloro-m-cresol	< 2 J	< 2.5	< 2	< 2	< 2
4-Chlorophenylphenyl ether	< 2 J	< 2.5	< 2	< 2	< 2
4-Nitroaniline	< 2 J	< 2.5	< 2	< 2	< 2
4-Nitrophenol	< 2 J	< 2.5	< 2 J	< 2 J	< 2 J
5-Nitro-o-toluidine	< 2 J	< 2.5	< 2	< 2	< 2
7,12-dimethylbenz[a]anthracene	< 2 J	< 2.5	< 2	< 2	< 2
Acenaphthene	< 2 J	< 2.5	< 2	< 2	< 2
Acenaphthylene	< 2 J	< 2.5	< 2	< 2	< 2
Acetophenone	< 2.6 J	< 3.2	< 2.6	< 2.6	< 2.6
Aniline	< 2.8 J	< 3.5	< 2.8 J	< 2.8 J	< 2.8 J
Anthracene	< 2 J	< 2.5	< 2	< 2	< 2
Azobenzene	< 2.4 J	< 3	< 2.4	< 2.4	< 2.4
Benzidine	< 32 J	< 40 J	< 32	< 32	< 32
Benzo(a)anthracene	< 2.6 J	< 3.2	< 2.6	< 2.6	< 2.6
Benzo(a)pyrene	< 2 J	< 2.5	< 2	< 2	< 2
Benzo(b)fluoranthene	< 2 J	< 2.5	< 2	< 2	< 2
Benzo(ghi)perylene	< 2.2 J	< 2.7	< 2.2	< 2.2	< 2.2
Benzo(k)fluoranthene	< 2 J	< 2.5	< 2	< 2	< 2

TABLE 6-7
Surface Water Analytical Results for Beaver Run Lagoon

SAMPLE ID SAMPLE DEPTH(ft) SAMPLE LOCATION SAMPLE DATE	SM004-SW06 0.00-0.00 SW06 6/17/1997	SM004-SW06R 0.00-0.00 SW06 / /	SM004-SW07 0.00-0.00 SW07 6/17/1997	SM004-SW08 0.00-0.00 SW08 6/17/1997	SM004-SW09 0.00-0.00 SW09 6/17/1997
PARAMETER					
Benzoic Acid	<2 J	<2.5	<2	<2	<2
Benzyl Alcohol	<2 J	<2.5	<2	<2	<2
Benzyl butyl phthalate	<2 J	<2.5	<2	<2	<2
Bis(2-chloroethoxy methane)	<2 J	<2.5	<2	<2	<2
Bis(2-chloroethyl)ether	<2 J	<2.5	<2	<2	<2
Bis(2-chloroisopropyl)ether	<2 J	<2.5	<2	<2	<2
Bis(2-ethylhexyl) phthalate	<5.8 J	<3 J	6.4	<2.4	4.6
Bisphenol A	61 J	<4.5	<3.6 J	<3.6 J	<3.6 J
Carbazole	<10 J	<12	<10	<10	<10
Chrysene	<2 J	<2.5	<2	<2	<2
Cyclohexanone	<2 J	<2.5	<2	<2	<2
Di-n-butyl phthalate	<31 J	<2.5	<2	<2	<2
Di-n-octyl phthalate	<2 J	<2.5	<2	<2	<2
Dibenz(a,h)anthracene	<2 J	<2.5	<2	<2	<2
Dibenzofuran	<2 J	<2.5	<2	<2	<2
Diethyl Phthalate	<2 J	<2.5 J	<2	<2	<2
Dimethylphthalate	<2 J	<2.5 J	<2	<2	<2
Ethyl Methane Sulfonate	<3.6 J	<4.5	<3.6	<3.6	<3.6
Fluoranthene	<2 J	<2.5	<2	<2	<2
Fluorene	<2 J	<2.5	<2 J	<2 J	<2 J
Heptachlor	<2.2 J	<2.7	<2.2	<2.2	<2.2
Hexachlorobenzene	<2 J	<2.5	<2	<2	<2
Hexachlorobutadiene (SVOA)	<2 J	<2.5	<2	<2	<2
Hexachlorocyclopentadiene	<2 J	<2.5	<2	<2	<2
Hexachloroethane	<2 J	<2.5	<2	<2	<2
Indeno(1,2,3-cd)pyrene	<2 J	<2.5	<2	<2	<2
Isophorone	<2 J	<2.5	<2	<2	<2
Methyl methane sulfonate	<2 J	<2.5	<2	<2	<2
N-Nitrosodibutylamine	<2 J	<2.5	<2	<2	<2
N-Nitrosodimethylamine	<2 J	<2.5	<2 J	<2 J	<2 J
N-Nitrosodiphenylamine	<2.6 J	<3.2	<2.6	<2.6	<2.6
N-Nitrosodipropylamine	<2 J	<2.5	<2	<2	<2
N-Nitrosopiperidine	<2 J	<2.5	<2	<2	<2
Naphthalene (SVOA)	<2 J	<2.5	<2	<2	<2
Nitrobenzene	<2 J	<2.5	<2	<2	<2
Pentachlorobenzene	<3.4 J	<4.2	<3.4	<3.4	<3.4
Pentachloronitrobenzene	<2 J	<2.5	<2	<2	<2
Pentachlorophenol	<2 J	<2.5	<2	<2	<2
Phenacetin	<2 J	<2.5	<2	<2	<2
Phenanthrene	<2 J	<2.5	<2	<2	<2
Phenol	<1.2 J	<1.5	<1.2 J	<1.2 J	1.2 J
Pyrene	<2 J	<2.5	<2	<2	<2
Pyridine	<2.2 J	<2.7	<2.2	<2.2	<2.2
Trimethylphosphate	<2 J	<2.5	<2	<2	<2
Triphenylphosphate	<10 J	<12	<10	<10	<10
m,p-Cresol	<3 J	<3.7	<3 J	<3 J	<3 J
m-Nitrotoluene	<2 J	<2.5	<2	<2	<2
m-Toluidine	<4 J	<5	<4	<4	<4
o,p-Toluidine	<10 J	<13	<10 J	<10 J	<10 J
o-Cresol	<2 J	<2.5	<2	<2	<2
o-Nitrotoluene	<2 J	<2.5	<2	<2	<2
p-Chloroaniline	<2 J	<2.5	<2	<2	<2
p-Dimethylaminoazobenzene	<2 J	<2.5	<2	<2	<2
p-Nitrotoluene	<3 J	<3.7	<3	<3	<3
Metals (µg/L)					
Antimony	<4	NA	<4	5.8 J	<4
Cadmium	<4	NA	<4	<4	<4
Chromium	<3	NA	<3	<3	<3
Lead	<4	NA	<4	<4	<4
Nickel	<4	NA	<4	<4	<4
Miscellaneous (µg/L)					
Total Organic Carbon	5550	NA	4540	3210	2780
Biological Oxygen Demand	<2000	NA	<2000	<2000	<2000
Chemical Oxygen Demand (low)	<5000	NA	<5000	5600 J	<5000
Nitrate	990 J	NA	760 J	1300 J	2500 J
Nitrite	<400	NA	<400	<400	<400
Oil & Grease	<5000	NA	<5000	<5000	<5000
Total Dissolved Solids	280000 J	NA	343000 J	273000 J	266000 J
Total Kjeldahl Nitrogen	<1000	NA	1780 J	<1000	2060 J
Total Suspended Solids	10500 J	NA	17500 J	41000 J	13500 J
pH	8 J std	NA	8 J std	7.9 J std	7.9 J std

B=Blank Contamination

J=Estimated Value

NA=Not Analyzed

R=Data Rejected for Quality Reason

Table 6-8
Comparison to Risk-Based Criteria
SWMU 4: Beaver Run Lagoon – Surface Water

Constituent	Maximum Detected Concentration (ug/L) ⁽¹⁾	Maximum Detection Limit for Non-Detects (ug/L)	Frequency of Detection	EPA Region III Risk-Based Concentrations Tap Water ⁽²⁾ (ug/L)	Human Health AWQC Water and Organisms ⁽³⁾ (ug/L)	Freshwater Ecological AWQC ⁽⁴⁾ (ug/L)	Maximum Detection Exceeds Criteria	Maximum Detection Limit Exceeds Criteria
MISCELLANEOUS								
Chemical Oxygen Demand (low)	6920 J	< 5000	2/9	--	--	--	No	No
Nitrate	2500 J	< 10	8/9	58000	10000	--	No	No
Oil & Grease	9510 J	< 5000	1/9	--	--	--	No	No
pH (std. units)	8.07 J	NA	9/9	--	--	6.5 - 9.0	No	No
Total Dissolved Solids	3430 J	NA	9/9	--	--	--	No	No
Total Kjeldahl Nitrogen	4040 J	< 1000	7/9	--	--	--	No	No
Total Organic Carbon	5800	NA	9/9	--	--	--	No	No
Total Suspended Solids	41000 J	NA	9/9	--	--	--	No	No
METALS								
Antimony	5.8 J	< 4.0	1/9	15	14	30	No	No
Nickel	0.01 JB	< 4.0	1/9	730	610	160	No	No
VOLATILES								
1,1,1,2-Tetrachloroethane	ND	< 1.0	0/9	0.41	--	2,400	No	> RBC
1,1,2,2-Tetrachloroethane	ND	< 2.0	0/9	0.052	0.17	2,400	No	> RBC, HAWQC
1,1,2-Trichloroethane	ND	< 2.0	0/9	0.19	0.6	9,400	No	> RBC, HAWQC
1,1-Dichloroethene	ND	< 1.0	0/9	0.044	0.057	46.6 ⁴	No	> RBC, HAWQC
1,2,3-Trichloropropane	ND	< 1.0	0/9	0.0015	--	--	No	> RBC
1,2-Dibromo-3-chloropropane	ND	< 3.0	0/9	0.048	--	--	No	> RBC
1,2-Dibromoethane	ND	< 1.0	0/9	0.00075	--	--	No	> RBC
1,2-Dichloroethane	ND	< 2.0	0/9	0.12	0.94	20,000	No	> RBC, HAWQC
1,2-Dichloropropane	ND	< 1.0	0/9	0.16	--	--	No	> RBC
Acrylonitrile	ND	< 10	0/9	0.12	0.058	2,600	No	> RBC, HAWQC
Benzene	ND	< 1.0	0/9	0.36	0.66	46 ⁴	No	> RBC, HAWQC
Bromodichloromethane	ND	< 1.0	0/9	0.17	--	1,100 ³	No	> RBC
Carbon Disulfide	290	< 3.0	4/9	1000	--	--	No	No
Carbon Tetrachloride	ND	< 1.0	0/9	0.16	0.4	229 ⁴	No	> RBC, HAWQC
Chloroform	ND	< 1.0	0/9	0.15	0.19	1,240	No	> RBC, HAWQC
Chloromethane	ND	< 3.0	0/9	1.4	--	1100 ³	No	> RBC
cis-1,3-Dichloropropene	ND	< 1.0	0/9	0.077	87	244	No	> RBC
Dibromochloromethane	ND	< 2.0	0/9	0.13	--	1100 ³	No	> RBC
Freon 113	4.0 JB	< 2.0	2/9	390	--	--	No	No
trans-1,3-Dichloropropene	ND	< 1.0	0/9	0.077	87	244	No	> RBC
Vinyl Acetate	2.0 J	< 2.0	1/9	37000	--	20.8 ⁴	No	No
Vinyl Chloride	ND	< 2.0	0/9	0.019	2	87.8 ⁴	No	> RBC
SEMICVOLATILES								
1,2,4,5-Tetrachlorobenzene	ND	< 3.0	0/10	1.8	38	--	No	> RBC
1,4-Dichlorobenzene	ND	< 2.0	0/9	0.44	400	15 ⁴	No	> RBC
1-Naphthylamine	ND	< 8.4	0/10	0.00052	--	--	No	> RBC
2,4,6-Trichlorophenol	ND	< 2.5	0/10	6.1	1.2	970	No	> HAWQC
2,4-Toluenediamine	ND	< 12	0/10	0.021	--	--	No	> RBC
2-Naphthylamine	ND	< 9.4	0/10	0.00052	--	--	No	> RBC
2-Nitroaniline	ND	< 3.0	0/10	2.2	--	--	No	> RBC
3,3'-Dichlorobenzidine	ND	< 15	0/10	0.15	0.0103	--	No	> RBC, HAWQC
5-Nitro-o-toluidine	ND	< 2.5	0/10	2	--	--	No	> RBC
Acetophenone	ND	< 3.2	0/10	0.042	--	--	No	> RBC
Azobenzene	ND	< 3.0	0/10	0.61	--	--	No	> RBC

TABLE 6-8
Comparison to Risk-Based Criteria
SWMU 4: Beaver Run Lagoon – Surface Water

Constituent	Maximum Detected Concentration (ug/L) ⁽¹⁾	Maximum Detection Limit for Non-Detects (ug/L)	Frequency of Detection	EPA Region III Risk-Based Concentrations Tap Water ⁽²⁾ (ug/L)	Human Health AWQC Water and Organisms ⁽³⁾ (ug/L)	Freshwater Ecological AWQC ⁽⁴⁾ (ug/L)	Maximum Detection Exceeds Criteria	Maximum Detection Limit Exceeds Criteria
Benzidine	ND	<40	0/10	0.00029	0.00012	3.86 ⁴	No	> RBC, HAWQC, ECO
Benzo(a)anthracene	ND	<3.2	0/10	0.092	--	0.027	No	> RBC, ECO
Benzo(a)pyrene	ND	<2.5	0/10	0.0092	--	0.014	No	> RBC, ECO
Benzo(b)fluoranthene	ND	<2.5	0/10	0.092	--	--	No	> RBC
Benzo(k)fluoranthene	ND	<2.5	0/10	0.92	--	--	No	> RBC
Bis(2-chloroethyl)ether	ND	<2.5	0/10	0.0092	--	--	No	> RBC
Bis(2-chloroisopropyl)ether	ND	<2.5	0/10	0.26	--	--	No	> RBC
Bis(2-ethylhexyl) phthalate	6.38	<5.8	5/10	4.8	--	160	> RBC	> RBC
Bisphenol A	61 J	<4.5	2/10	1800	--	--	No	No
Carbazole	ND	<12	0/10	3.4	--	--	No	> RBC
Dibenzo(a,h)anthracene	ND	<2.5	0/10	0.0092	--	--	No	> RBC
Heptachlor	ND	<2.7	0/10	0.0023	0.00025	0.0038	No	> RBC, HAWQC, ECO
Hexachlorobenzene	ND	<2.5	0/10	0.0066	0.00072	3.7	No	> RBC, HAWQC
Hexachlorobutadiene	ND	<2.0	0/9	0.14	0.45	9.3	No	> RBC, HAWQC
Hexachlorocyclopentadiene	ND	<2.5	0/10	0.15	206	5.2	No	> RBC
Hexachloroethane	ND	<2.5	0/10	0.75	1.9	540	No	> RBC, HAWQC
Indeno(1,2,3-cd)pyrene	ND	<2.5	0/10	0.092	--	--	No	> RBC
m-Toluidine	ND	<5.0	0/10	0.35	--	--	No	> RBC
N-Nitrosodibutylamine	ND	<2.5	0/10	0.012	0.0064	--	No	> RBC, HAWQC
N-Nitrosodimethylamine	ND	<2.5	0/10	0.0013	0.0014	--	No	> RBC, HAWQC
N-Nitrosodipropylamine	ND	<2.5	0/10	0.0096	--	--	No	> RBC
Naphthalene	1.00 J	<1.0	2/9	1500	--	24 ⁴	No	No
o,p-Toluidine	ND	<13	0/10	0.35	--	--	No	> RBC
Pentachloronitrobenzene	ND	<2.5	0/10	0.041	--	--	No	> RBC
Pentachlorophenol	ND	<2.5	0/10	0.56	1010	13	No	> RBC
Phenol	1.24 J	<1.5	1/10	22000	3500	2,560	No	No
Trimethylphosphate	ND	<2.5	0/10	1.8	--	--	No	> RBC

"J" - Estimated value.

NA - Not applicable.

"B" - Blank contamination.

ND - Not detected.

(1) "ug/L" - Units reported in micrograms per liter (equivalent to parts per billion) unless otherwise noted.

(2) USEPA Region III, 1998

(3) USEPA, 1993

(4)Chronic tier II value from USEPA (1996) or Suter (1996)

(5)AWQC for halomethanes. A chronic value was estimated from the acute value by division with an uncertainty value of 10.

(6)A chronic value was estimated from the acute value by division with an uncertainty value of 10.

--" - Value not available for this constituent.

7.0 SITE-WIDE GROUNDWATER

This section discusses site-wide groundwater conditions at the facility. Bayer currently monitors groundwater on a quarterly basis and has performed groundwater monitoring since 1985. An overview of the geology and hydrogeology is presented to provide a basic understanding of the site groundwater conditions. Additionally, a screening level risk assessment has been performed using the 1998 quarterly groundwater monitoring data in order to further assess current groundwater quality.

7.1 SITE GEOLOGY

The Bayer facility is underlain by both unconsolidated deposits and bedrock. Figure 7-1 provides locations of geologic cross-sections and Figures 7-2 through 7-5 provide cross-sections through selected facility borings.

7.1.1 Unconsolidated Deposits

Construction of the facility has led to extensive reworking of surficial deposits. A variety of fill materials including gravel, silt, clay, slag, cinders, and process-related residues have been placed in low-lying areas to achieve desired ground elevations. Investigations of the facility have identified some areas where fill materials exceed 26 feet. At other facility locations (with the exception of landfills), earthen fill normally does not exceed 10 to 15 feet in thickness, and becomes generally less extensive and thinner toward the valley wall and more northern portions of the site.

Naturally occurring surficial deposits are composed predominantly of alluvial silt and clay (fine-grained alluvium), with varying amounts of fine sand. The fine-grained alluvium extends to depths of 40 feet or more beneath much of the plant site. In areas near the valley wall, the fine-grained alluvium is interfingered with colluvium. The colluvium consists of fine-grained deposits weathered from the bedrock hillside, thickens eastward, and contains varying amounts of broken and weathered rock fragments.

The fine-grained-alluvium and colluvium are also characterized by relatively low vertical permeability, ranging from 3.5×10^{-6} to 1.9×10^{-8} centimeters per second (cm/sec), and limit infiltration of vertical recharge to the underlying alluvial aquifer system. As a result, groundwater tends to accumulate on top of silt- and clay-rich layers and perched water is

common, particularly beneath areas of the plant where relatively loose fill has been placed on top of less permeable silts and clays (Geraghty & Miller, 1985a).

The fine-grained alluvium and colluvium are generally underlain by coarser grained unconsolidated sediments that comprise the alluvial aquifer system. The uppermost unit comprising the alluvial aquifer is composed of fine sand with varying amounts of silt. This unit exists, more or less, as an elongated lens (up to 20 feet thick) that extends beneath much of the main plant area and pinches out toward the valley wall (Geraghty & Miller, 1985a).

Medium to coarse sand and fine gravel outwash deposits underlie the fine-grained alluvium and sand deposits. The sand and gravel outwash deposits are present beneath all portions of Wells Bottom except where the alluvial aquifer pinches out against rising bedrock valley wall. Beneath the main plant area, the sand and gravel body averages 20 to 30 feet in thickness and extends to bedrock at a depth generally not exceeding 70 feet, marking the lower limit of the alluvial aquifer system.

7.1.2 Bedrock Geology

Beneath the Bayer facility, alluvial deposits are underlain by Paleozoic age bedrock. Regional data indicate that rock immediately subjacent to alluvial material consists of shale, claystone, and limestone. Deeper strata (to depths of more than 6,800 feet) consist of sandstone, siltstone; chert and cherty limestone, dolomite, anhydrite and salt (Price and others, 1956). The buried bedrock surface beneath Wells Bottom slopes from east to west, towards the Ohio River.

Steeply rising bedrock east of West Virginia Route 2 consists of Pennsylvanian- and Permian-age sedimentary rock. Test drilling data from site east of Route 2 indicate the presence of relatively flat lying beds of siltstone, sandstone, claystone, and shale, with a few beds of coal (GAI, Inc. 1981).

Geraghty & Miller installed two bedrock coreholes/monitoring wells (GM-5B and GM-16B) at the facility. Geraghty & Miller reported bedrock at an elevation of approximately 575 ft-msl in boring GM-5B and at 577 ft-msl in GM-16B. The uppermost bedrock units consist of reddish-brown and gray shales interbedded with thin, calcareous sandstone lenses. The upper portion of bedrock is often highly weathered. The sandstone lenses are fine to very fine-grained and well cemented, with few fractures. With depth, shale competence was observed to increase and the

degree of fracturing and weathering appears to decrease. The degree of calcium cementation within the shale and sandstone also appears to increase with depth (Geraghty & Miller, 1988a).

7.2 SITE HYDROGEOLOGY

7.2.1 Monitoring Wells

More than 151 monitoring wells have been installed at the Bayer facility since 1954. Appendix H-1 summarizes the well construction and status of each monitoring well. Figure 7-6 provides the location of all active facility monitoring wells.

7.2.2 Production Wells

Seven production wells (IB-1 through IB-7) and one Ranney well have been installed at the Bayer facility since it began operation in 1954. Appendix H-2 summarizes the well construction and status of each production well. Prior to the late 1970s, groundwater from the production wells was the major source of process and sanitary water for the New Martinsville facility. Since that time, Bayer has drawn the majority of its production water from the Ohio River and the production wells have not been in service for this use with the exception of the Ranney Well which is periodically used. Periodically, however, the production wells have been used for aquifer testings and gradient control purposes (Geraghty & Miller, 1985a). Figure 7-2 provides the location of the production wells.

7.2.3 Recovery Wells

Three Recovery wells were installed into the upper portion of the alluvial aquifer by Geraghty & Miller between November 1985 and March 1986. Recovery wells RW-2 and RW-3 were abandoned and replaced with RW-2a and RW-3a in 1997. The purpose of these wells is to hydraulically contain potentially contaminated groundwater within Bayer property boundary. Currently, the recovery wells pump at a combined rate of approximately 400 gallons per minute (gpm). Groundwater monitoring has consistently shown hydraulic containment of the alluvial aquifer since these wells were placed on-line in 1986. Figure 7-7 shows the typical configuration of the potentiometric surface in the upper alluvial aquifer. This surface indicates that the wells are effective in creating a depression in the groundwater surface which indicates that groundwater should be contained on-site. Water from these wells are treated prior to being discharged under the facility's National Pollutant Discharge Elimination System (NPDES) permit.

7.2.4 Groundwater Occurrence and Flow

Groundwater occurs within both unconsolidated deposits and bedrock beneath the facility.

7.2.4.1 Unconsolidated Deposits

Two types of water-bearing zones occur within the unconsolidated deposits beneath the Bayer Facility: 1) shallow, localized zones of perched groundwater and 2) the Ohio River Valley alluvial aquifer.

Perched Groundwater

Perched groundwater occurs mostly in areas where natural silt-and clay-rich alluvium has been covered with relatively more permeable fill consisting of materials such as residue, sand, or gravel. As a result, recharge water percolating through the fill tends to accumulate on top of the less permeable silts and clays to create a perched body of groundwater (Geraghty & Miller, 1985a). These perched zones are relatively discontinuous across the site. Areas of the plant that were initially low lying (i.e., the infilled wastewater ditch) with low-permeability surficial deposits (i.e., silt and clay) and which were infilled with relatively impermeable fill materials commonly support perched groundwater zones (Geraghty & Miller, 1985a). Geraghty & Miller (1985a and 1988a) identified the presence of perched groundwater zones within the main plant and south landfill areas.

Because they are situated at shallow depths within relatively permeable materials, perched water bodies have a fairly direct response to recharge events and tend to be subject to short-term fluctuations in water levels. The extent to which water levels increase in response to a given volume of recharge and the period of time over which fluid head dissipates following recharge is a reflection of the rate at which groundwater infiltrates through underlying silt- and clay-rich deposits and/or dissipates laterally to discharge zones.

In the main plant area, discharge is believed to be primarily downward, such that perched water ultimately recharges the alluvial aquifer. In the south landfill area, downward discharge also represents an important route for groundwater departing the perched zone. The south landfill body of perched water occurs in close proximity to, and at a higher elevation than backwaters of Beaver Run, and it is possible that perched groundwater also discharges laterally into this surface water body. However, backwater samples collected by NUS Corporation during their preliminary site investigation (on behalf of EPA) showed non-detectable levels of organic

compounds in Beaver Run (Geraghty & Miller, 1985a). Additional testing of Beaver Run by Bayer (1986 to 1994, and 1996), which has only found periodic low levels of VOCs and SVOCs thought to be associated with blank contamination, has confirmed NUS's findings.

Lateral flow within the perched zone appears to roughly coincide with the natural drainage prior to infilling. The hydraulic conductivities of fill materials based on slug test results range from 0.4×10^{-4} cm/sec to 6.8×10^{-3} cm/sec (Geraghty & Miller, 1986a). Geraghty & Miller calculated lateral flow velocity of the fill materials to range between 10 and 364 feet per year (ft/yr). Vertical flow velocities were also calculated by Geraghty & Miller and are reported to range from 0.41 to 3.63 ft/yr. Saturated thickness of the perched zones range from less than 2 feet to more than 15 feet (Geraghty & Miller, 1986a).

Alluvial Aquifer

The main aquifer beneath the Bayer facility is the Ohio River Valley Alluvial Aquifer. The alluvial aquifer beneath the Bayer facility consists generally of an elongated lens of up to 20 feet of fine sand with varying amounts of silt overlying a medium to coarse sand and fine gravel outwash deposit that averages 20 to 30 feet in thickness. The base of the alluvial aquifer extends to the top of bedrock, which is found at depths generally not exceeding 70 ft-bgs (Geraghty & Miller, 1985a).

The alluvial aquifer exists under water table and semi-confined conditions. This aquifer receives recharge via leakage from overlying alluvial deposits and, to a limited degree, from lateral discharges emanating from the bedrock system near the valley wall. Relatively minor exchange into the alluvial aquifer may also occur from the underlying bedrock system beneath the Bayer facility. Under pumping conditions, where water levels within the aquifer are drawn down below the river pool elevation, induced river inflow becomes the main source of aquifer recharge (Geraghty & Miller, 1985a).

The alluvial aquifer hydrogeologic properties have been characterized through pumping tests at production well IB-4 (screened in the lowermost portion of the alluvial aquifer), and at the three RW-series recovery wells (screened in the uppermost portion). A summary of hydrogeologic properties calculated using the alluvial aquifer pumping test data is provided in Appendix H-3. The alluvial aquifer is very prolific, exhibiting specific capacities of as much as 40 gallons per minute per foot (gpm/foot) of drawdown, and a hydraulic conductivity on the order of 1.0 cm/sec. Given the saturated thickness (and available drawdown) of aquifer deposits, single wells

installed into the alluvial aquifer can be capable of yields in excess of 1,000 gpm (Geraghty & Miller, 1985a and 1988a).

Prior to development of the alluvial aquifer, groundwater flow was probably from east to west, with the Ohio River representing the major discharge zone. Due to the pumping of the recovery wells, groundwater flow within the alluvial aquifer is radial toward the center of the facility. Figures 7-7 provides groundwater elevation contour map for the upper portion of the alluvial aquifer.

Under natural (non-pumping) conditions, the alluvial aquifer would exist under artesian conditions beneath much of Bayer. However, the continuous withdrawal of groundwater to fulfill the needs of local industries and to control flow gradients within the aquifer causes drawdowns which are sufficient to create water table conditions within portions of the alluvial aquifer beneath the central and northern areas of the plant (i.e., groundwater levels are drawn down below the base of the overlying silt- and clay-rich confining unit).

Throughout the facility's history, pumping well operation (groundwater production wells, recovery wells, and the Ranney well) within the alluvial aquifer has lowered groundwater levels, causing a continuous inflow of river water. Upon entering the aquifer, this water (along with other recharge) flows according to hydraulic gradients established by major pumping centers. These pumping centers have shifted over time due to cessation of pumping at certain wells and the addition of new wells.

It is important to note that all pumping schemes observed in past investigations and in current data have established hydraulic gradients sloping into the alluvial aquifer (i.e., induced recharge) from the major surface water bodies (Geraghty & Miller, 1985a). As a result, water is entering the alluvial aquifer from the Ohio River and backwater areas, and there is not apparent natural discharge of alluvial aquifer fluids to surface water bodies in the vicinity of the Bayer facility. Additionally, gradients established by pumping induce groundwater flow toward the plant from all directions; thus containing any potential contaminants found on-site within Bayer's property boundary.

7.2.4.2 Bedrock System

Beneath the alluvial aquifer, the facility is also underlain by a bedrock system capable of producing groundwater. Regional data indicate that wells completed in the bedrock aquifer are

generally low yielding (relative to the alluvial aquifer) and commonly produce groundwater containing relatively high levels of natural dissolved constituents. As the result of these conditions, and the added expense of drilling bedrock wells versus alluvial wells, the bedrock system in the area has not been extensively developed (Geraghty & Miller, 1985a).

Existing data indicate that alluvial deposits are receiving recharge from bedrock along the valley wall (GAI, Inc. 1981). This recharge is believed to move primarily laterally through bedding planes and fractures within layers of sandstone. In some instances, water-bearing zones within sandstone units may exist under artesian conditions, being confined by alternating beds of claystone and shale that serve as aquitards (Geraghty & Miller, 1985a).

Groundwater elevation data collected from bedrock monitoring wells and adjacent alluvial aquifer monitoring well show static bedrock groundwater elevations are higher than corresponding alluvial aquifer groundwater elevations. The upward hydraulic gradient is most pronounced near well cluster GM-5B, where about 2 feet of head difference typically exists between the upper bedrock and the alluvial aquifer. Groundwater elevation differences between the bedrock and alluvial aquifer are less pronounced to the east near well cluster GM-16, where the upward gradient averages about 0.5 foot of head (Geraghty & Miller, 1988a).

Groundwater yield from the monitoring wells installed into the bedrock coreholes is probably controlled mainly by the degree of weathering and/or by the number and continuity of the fractures intersected by the well/corehole, and is likely to vary from one location to another. Monitoring well GM-16B, which is screened into relatively tight (less permeable) bedrock deposits, requires over 30 days to achieve static equilibrium following evacuation. However, well GM-5B, which is screened into somewhat more fractured limestone/sandstone, is capable of yielding a constant flow of over 1 gpm (Geraghty & Miller, 1988a).

In summary, the upper bedrock strata yield low volumes of groundwater characterized by water quality that is significantly different from the overlying alluvial aquifer water quality. The bedrock strata are separated from the overlying alluvial aquifer by shale confining layers immediately below the alluvium and also by the upward hydraulic gradient exerted by the bedrock system. Organic chemical concentrations detected within bedrock groundwater have been sporadic in occurrence and are likely attributable to sampling and/or analytical procedures (Geraghty & Miller, 1988).

7.2.4.3 Groundwater Flow Between Water Bearing Horizons

Hydraulic Connection Between Perched Zones and the Alluvial Aquifer

Perched water zones recharge the underlying alluvial aquifer. Geraghty & Miller estimated vertical flow velocities of groundwater moving through confining layers at the base of these perched zones ranged from 0.33 to 4.78 feet per year, representing low-end estimates, and 3.3 to 47.8 feet per year representing high end estimates (Geraghty & Miller, 1985a).

Hydraulic Connection Between Alluvial Aquifer and Bedrock

The potential for fluid exchange between bedrock and the alluvial aquifer beneath the main plant is dependent upon the hydraulic-head relationship(s) between these water-bearing systems and the vertical permeability within upper bedrock units.

Because the uppermost rock units beneath the site consist primarily of shale and siltstone, which are commonly characterized by low permeability, vertical migration of fluids through these strata is expected to be minor, if in fact, such migration were to occur. The potential for impacting water quality within the bedrock system is further reduced because water quality alterations within the alluvial aquifer are largely restricted to upper zones and the hydraulic heads measured in the bedrock wells are higher than the alluvial aquifer wells (Geraghty & Miller, 1988a).

7.3 WATER USE

The Bayer facility is located approximately 5 miles north of the city of New Martinsville (Figure 1-1). The small town of Procter is located approximately one-half mile south of Bayer's southern property boundary. The PPG Industries Inc. Natrium plant is located north of the Bayer facility. Air Products and Chemicals, Inc. owns property that is bounded to the north, south, and west by the Bayer Facility. Historically, the area surrounding the Bayer facility existed as undeveloped industrial, agricultural, or rural residential property. Currently, the area is predominantly industrial. Bayer received an industrial land use designation from the USEPA.

The Ohio River is the main body of surface water in the area and, with respect to volume, constitutes an almost unlimited water supply. The quality of water from the Ohio River is suitable for many industrial uses; however, owing to suspended sediments and the possible presence of undesirable chemical constituents resulting from upstream operations, some type of treatment is generally required for most uses (Geraghty & Miller, 1985a).

Groundwater constitutes an important source of water supply in the New Martinsville area. The main water-bearing unit, the Ohio River Valley Alluvial Aquifer, is composed of the medium to coarse sand and gravel outwash deposits. Yields from wells penetrating these sediments are reported to range from 100 to several thousand gpm, and natural water quality is generally good with TDS concentrations of 500 milligrams per liter (mg/L) or less; locally, water may be hard and sulfurous (Price and others, 1956).

The Grandview Doolin Public Service District, located approximately one-half mile downstream, supplies water to the town of Procter. The Grandview Doolin wells extract groundwater from the Ohio River Valley Alluvial Aquifer. Bayer has installed and monitors wells between the facility and the Grandview-Doolin well to act as early warning of off-site migration.

The Paleozoic bedrock units which underlie the alluvial aquifer are also capable of producing groundwater. Because well yields are generally low compared to the alluvial aquifer and the water commonly contains relatively high levels of dissolved natural constituents, bedrock units have not been extensively developed as a groundwater supply in the vicinity of the Bayer Facility (Geraghty & Miller, 1985a).

7.4 GROUNDWATER QUALITY

Bayer has collected and analyzed samples from numerous groundwater wells at the New Martinsville facility on a quarterly basis since 1985. Bayer conducts groundwater monitoring on a quarterly basis in accordance with a USEPA approved groundwater monitoring plan. Groundwater monitoring reports are submitted to USEPA on an annual basis. All of the samples are analyzed for a complete suite of VOCs, SVOCs, and metals.

Figure 7-8 shows the maximum concentrations of detected constituents in each of the wells included in the 1998 quarterly monitoring plan. The 1998 quarterly groundwater data is provided in Appendix H-3. The sample results indicate that the primary constituents detected are (maximum detection in 1998): benzene (1.23 mg/L), chlorobenzene (178 mg/L), 1,2-dichlorobenzene (1.68 mg/L), nitrobenzene (2.8 mg/L), bisphenol A (40 mg/L), phenol (2.24 mg/L), 2,4-dinitrotoluene (12.5 mg/L), 2,6-dinitrotoluene (7.4 mg/L), 5-nitro-o-toluene (1.02 mg/L), o-nitrotoluene (1.59 mg/L), p-nitrotoluene (1.31 mg/L), bis(2-ethylhexyl)ether (1.15 mg/L). The concentration distribution (Figure 7-8) indicates that these constituents are found at the highest concentrations in proximity to and within the area of influence of recovery wells RW-1 and RW-3a.

7.5 GROUNDWATER RISK EVALUATION

A screening level risk evaluation was performed by comparing the most recently compiled groundwater results (1998) from twenty-four on-site monitoring wells and four off-site wells included in the facility's quarterly groundwater monitoring program to established groundwater quality criteria.

The water at the plant that is contacted or used for potable purposes is obtained from a public water system (ICF, 1995). Site groundwater is used on a limited basis, as non-contact cooling water and wash water on a RCRA pad. In both cases, the groundwater is treated prior to being discharged via the facility's NPDES permit.

Table 7-1 provides a summary of the 1998 on-site groundwater data along with a comparison of the maximum detected concentrations with the respective Federal MCL for drinking water. If a MCL does not exist then the U.S.EPA Region III RBC for tap water (USEPA, 1999) for the constituent was used as the screening criteria. Some constituents had neither an established MCL nor a RBC for comparison. Twenty-two constituents were detected in on-site groundwater that had maximum detected concentrations that exceeded the established criteria.

Groundwater monitoring data from three off-site residential wells (Cains, Richmond, and Rothisberger) and the Grandview-Doolin Public Service District municipal well was screened to evaluate risks to potential off-site receptors. The comparison of the 1998 analytical data from the off-site wells to the established criteria is presented in Table 7-2. Only two constituents were detected in off-site wells. These constituents were detected below the established criteria and are believed to be the result of laboratory or bottleware contamination.

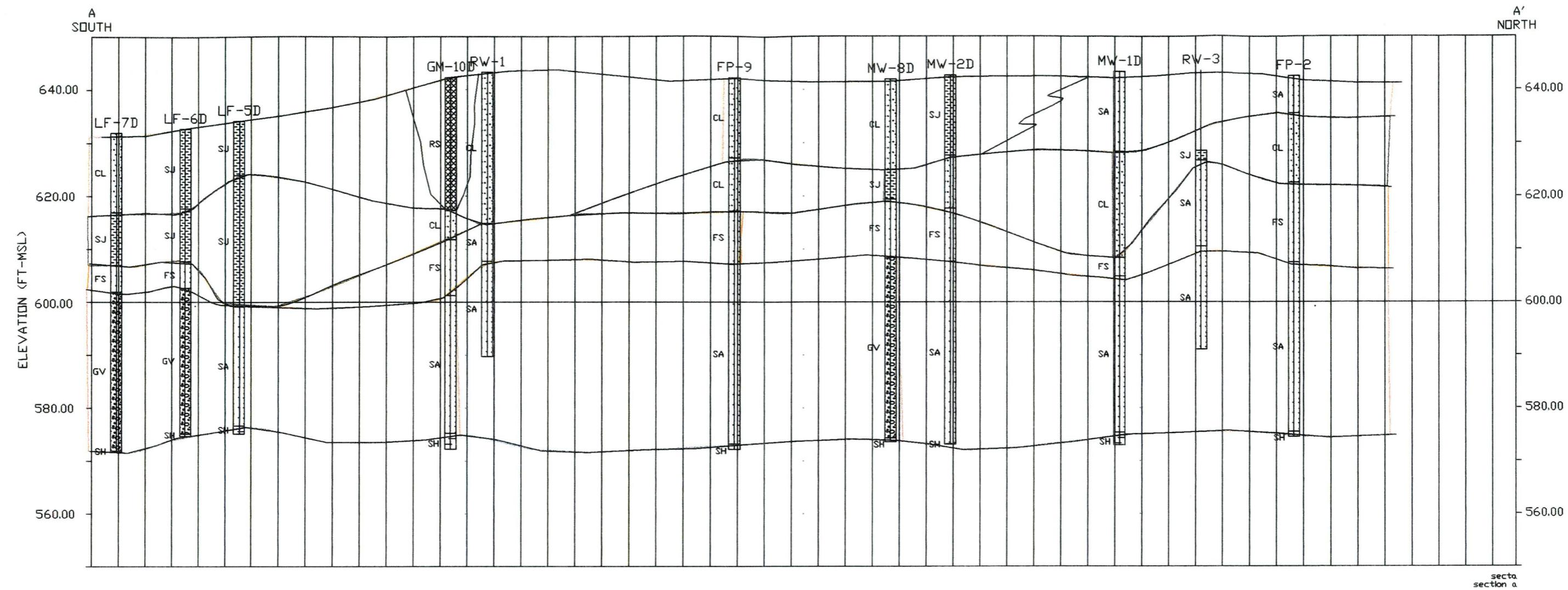
Phenol was detected at a concentration of 0.00191 mg/L (ppm) in the Richmond well in June of 1998. However, phenol was also detected in the June 1998 trip blank at a concentration of 0.00166 mg/L. As a result, the presence of phenol in the Richmond well is highly suspect. Acetone was detected in the Cains well in June of 1998 at a concentration of 0.0377 mg/L. Although laboratory blank data is not available, acetone is not characteristic of the on-site groundwater and is recognized by the U.S.EPA as a common laboratory contaminant (USEPA, 1989). As a result, the presence of acetone in the Cains well is highly suspect. For this evaluation the current pumping conditions at the facility were assumed to represent baseline conditions. If pumping conditions are changed in the future the potential for the migration of site-impacted groundwater to off-site receptors should be re-evaluated.

7.6 GROUNDWATER SUMMARY

Comparison of the 1998 groundwater monitoring data to established criteria indicates that 22 constituents in on-site groundwater exceed the respective MCLs or tap water RBC. However, comparison of groundwater monitoring data from residential wells in the vicinity of the Bayer facility and the Grandview-Doolin Public Service District municipal well does not indicate the presence of site-related constituents. Additionally, Bayer installed and monitors MW-110, MW-120, MW-14, and MW-15 to provide early detection of site constituents before they can reach the Grandview-Doolin well. MW-14 and MW-15 were installed in November 1998 and were not complete until 1999. The 1998 sample results from MW-110 and 120 did not indicate off-site migration of constituents.

Groundwater at the site has been monitored on a quarterly basis since 1985. Three groundwater recovery wells have been pumping from the alluvial aquifer since 1986. The quarterly groundwater monitoring data consistently indicates that these wells effectively control the hydraulic gradient in the alluvial aquifer and effectively capture the groundwater plume on-site. Water from these wells is treated and discharged under the Bayer's NPDES permit.

Although monitoring data indicates that groundwater is contained beneath the site, constituents are present that exceed their respective RBCs and MCLs. This indicates that the current recovery system is achieving its goal of containing groundwater. However, the groundwater quality data indicates that constituents still exceed water quality criteria after 15 years of pumping. Therefore, a CMS is recommended for site-wide groundwater to evaluate the available technologies to expedite the groundwater restoration.



LEGEND:

CL = CLAY
 SJ = SILT
 SA = FINE TO COARSE SAND
 GV = GRAVEL
 FS = FINE SAND
 RS = RESIDUE
 SH = SHALE
 SS = SANDSTONE
 CO = COAL
 LS = LIMESTONE
 ST = SILSTONE
 MS = MUDSTONE

FIGURE 7-2

BAYER CORP., NEW MARTINSVILLE FACILITY
NEW MARTINSVILLE, WV.

GEOLOGIC
CROSS-SECTION A-A'

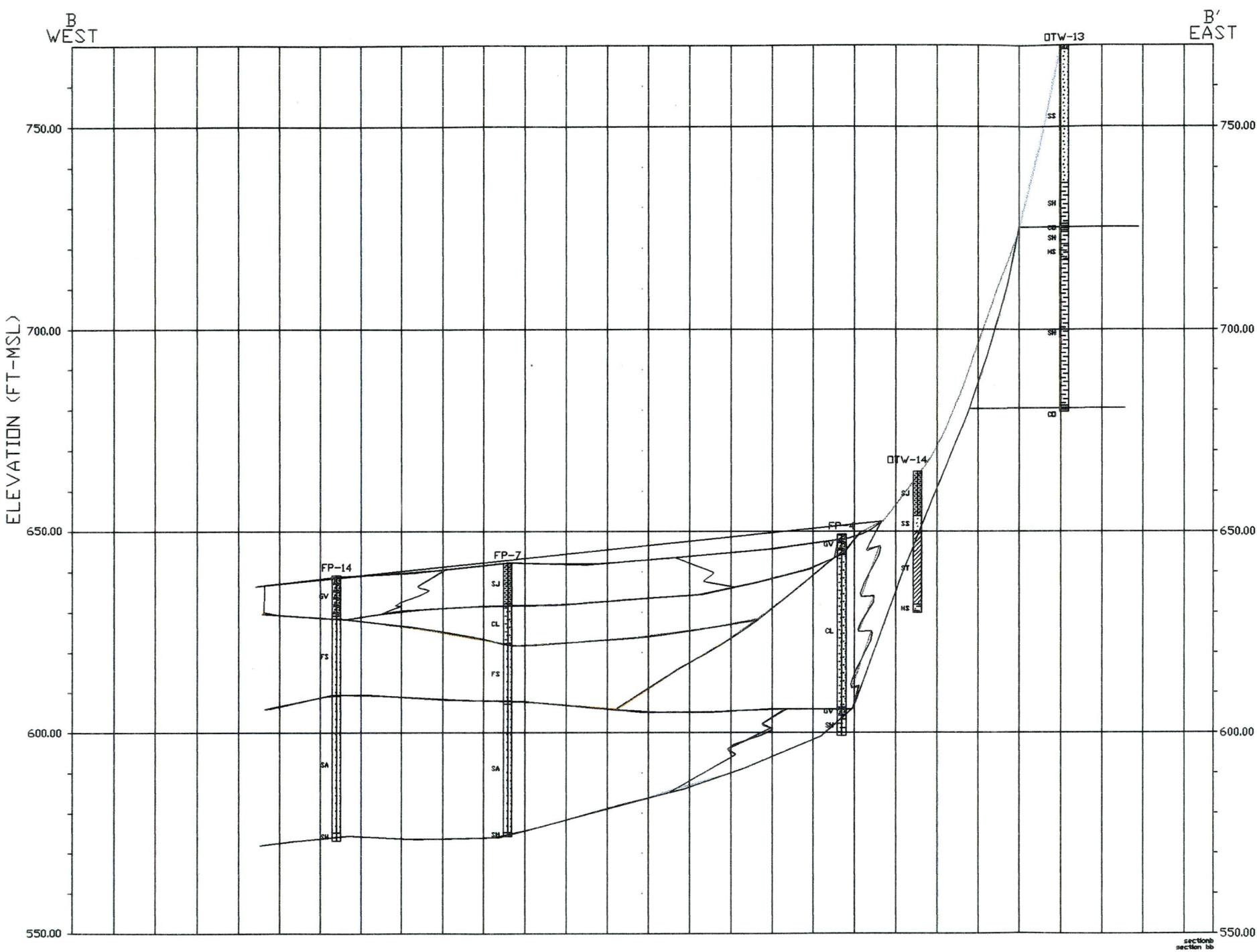
IT Corporation

DATE: 1/27/00

DR.: D. EVANS

SCALE: N.T.S.

DWG. NO. 800588-B27



LEGEND:

CL = CLAY
 SJ = SILT
 SA = FINE TO COARSE SAND
 GV = GRAVEL
 FS = FINE SAND
 RS = RESIDUE
 SH = SHALE
 SS = SANDSTONE
 CO = COAL
 LS = LIMESTONE
 ST = SILTSTONE
 MS = MUDSTONE

FIGURE 7-3

BAYER CORP., NEW MARTINSVILLE FACILITY
NEW MARTINSVILLE, WV.

IT Corporation

GEOLOGIC
CROSS-SECTION B-B'

DATE: 1/27/00

DR.: D. EVANS

SCALE: N.T.S.

DWG. NO.: 800588-B28

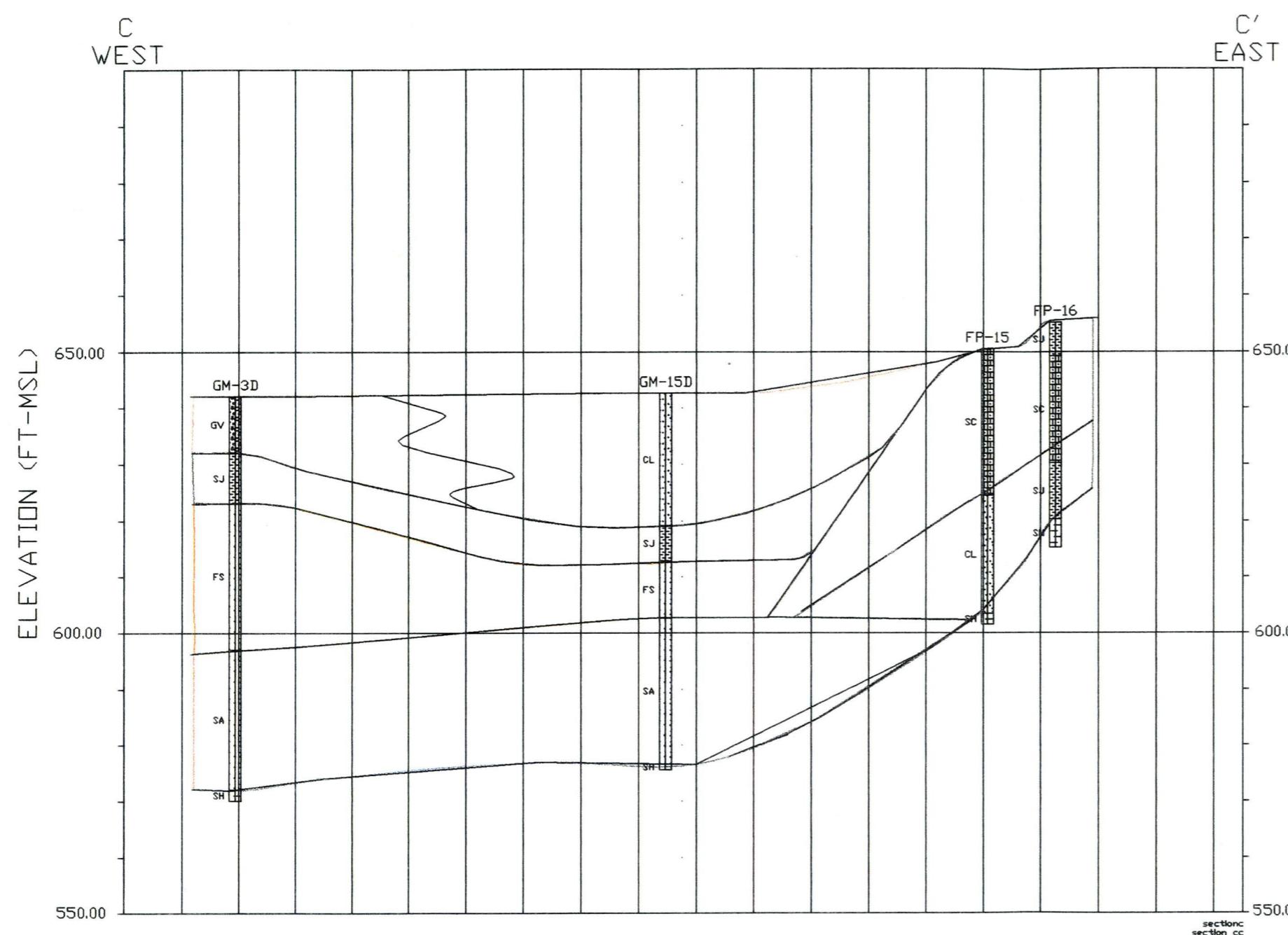


FIGURE 7-4

BAYER CORP., NEW MARTINSVILLE FACILITY
NEW MARTINSVILLE, WV.

GEOLOGIC
CROSS-SECTION C-C'

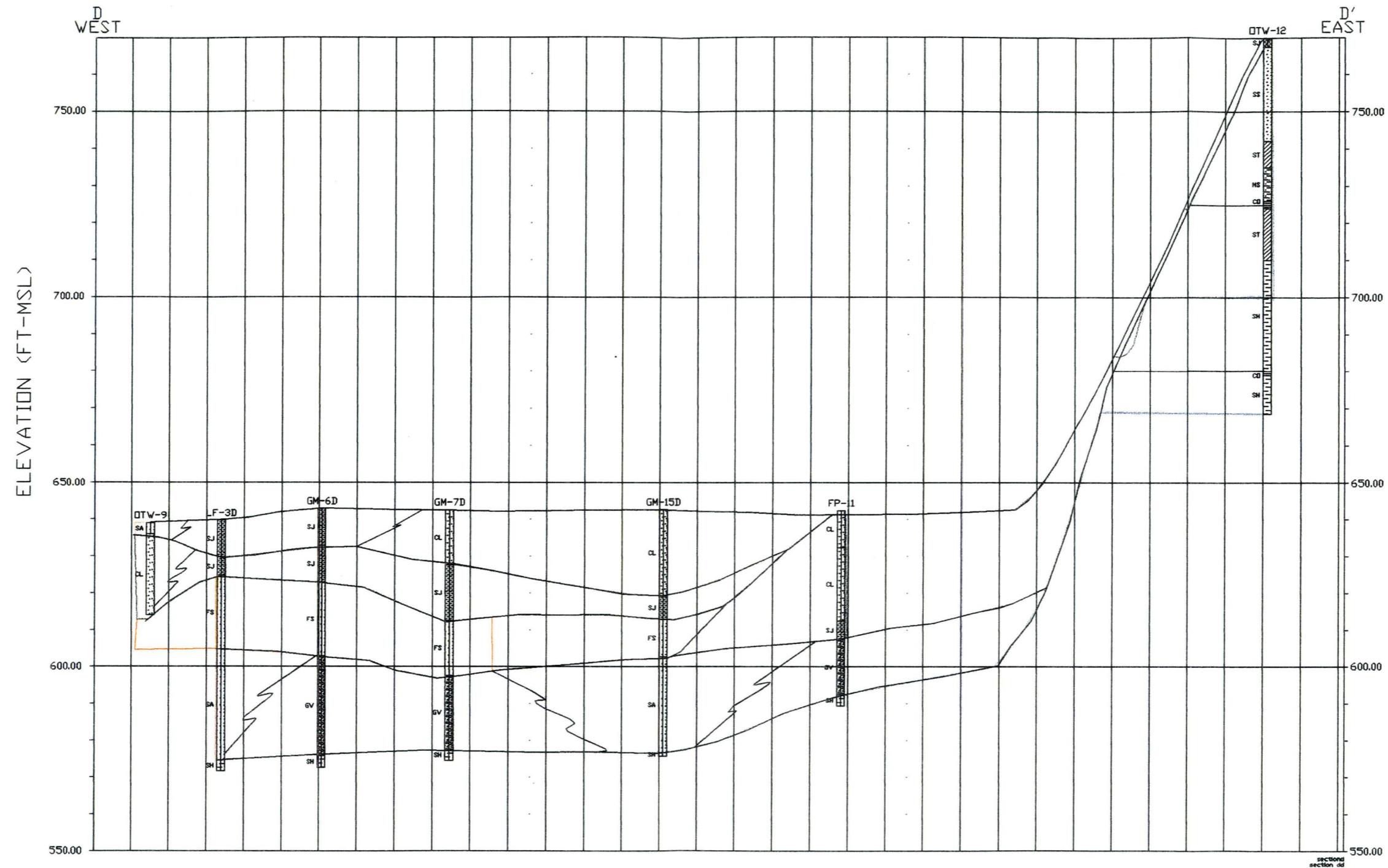
IT Corporation

DATE: 1/27/00

DR.: D. EVANS

SCALE: N.T.S.

DWG. NO. 1800588-B29



LEGEND:

CL = CLAY
 SJ = SILT
 SA = FINE TO COARSE SAND
 GV = GRAVEL
 FS = FINE SAND
 RS = RESIDUE
 SH = SHALE
 SS = SANDSTONE
 CO = COAL
 LS = LIMESTONE
 ST = SILTSTONE
 MS = MUDSTONE

BAYER CORP., NEW MARTINSVILLE FACILITY
NEW MARTINSVILLE, WV.

FIGURE 7-5

GEOLOGIC
CROSS-SECTION D-D'

IT Corporation

DATE: 1/27/00

DR.: D. EVANS

SCALE: N.T.S.

DWG. NO.: 800588-B30



JOB NO.: 80058830400000 PLOT SCALE: 1=400
STARTED ON: 1/27/00 REVISED: 0/00/00

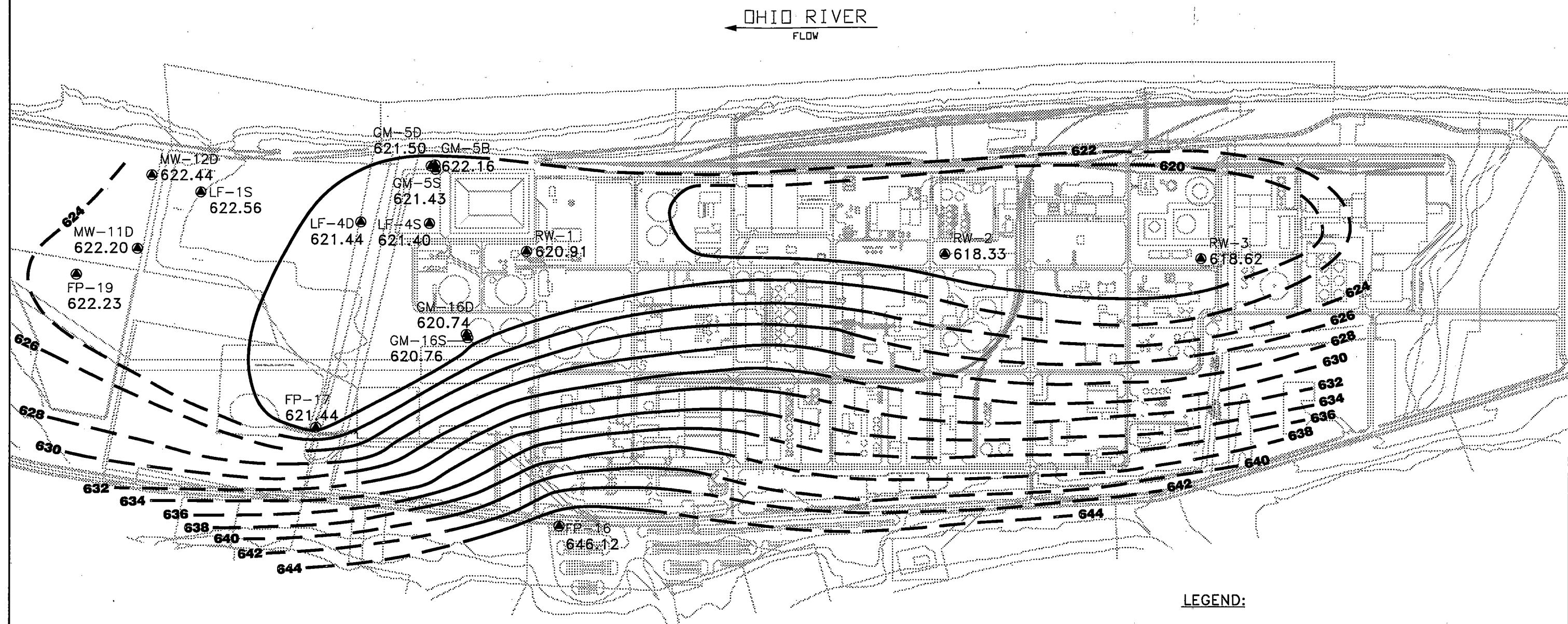


FIGURE 7-7

BAYER CORPORATION NEW MARTINSVILLE FACILITY NEW MARTINSVILLE, WV	TYPICAL GROUNDWATER ELEVATION CONTOURS UPPER ALLUVIAL AQUIFER FIRST QUARTER 1997	
IT Corporation	DATE: 1/27/00	DR.: B. SNYDER
	SCALE: 1"=400'	FILE NAME: 800588-B31

LE 7-1
Screening of Constituents in On-Site Groundwater (1998)

Constituent	CAS Number	Units	Frequency of Detection	Range of Detections		Sample of Maximum Detection	Benchmark Screening Levels ¹	Ref.	Maximum Detection Exceeds Benchmark
1,2-Dichlorobenzene	95-50-1	mg/l	17 - 62	0.0025	- 1.68	RW-2a (ECD# 981-15)	6.0E-01	2	Max. Det. > Bench
1,4-Dichlorobenzene	106-46-7	mg/l	5 - 62	0.00284	- 0.133	RW-2a (ECD# 981-15)	7.5E-02	2	Max. Det. > Bench
2,4-Diaminotoluene	95-80-7	mg/l	5 - 63	0.123	- 0.811	RW-1 (ECD#983-14)	2.1E-05	3	Max. Det. > Bench
2,4-Dinitrotoluene	121-14-2	mg/l	10 - 63	0.00312	- 12.5	MW-10S (ECD#981-28)	7.3E-02	3	Max. Det. > Bench
2,6-Dinitrotoluene	606-20-2	mg/l	8 - 63	0.0216	- 7.42	MW-10S (ECD#981-28)	3.7E-02	3	Max. Det. > Bench
2-Nitrotoluene	88-72-2	mg/l	10 - 63	0.00242	- 1.59	RW-3a (ECD# 981-16)	6.1E-02	3	Max. Det. > Bench
3-Nitrotoluene	99-08-1	mg/l	4 - 63	0.00618	- 0.129	RW-3a (ECD# 981-16)	1.2E-01	3	Max. Det. > Bench
4-Nitrotoluene	99-99-0	mg/l	7 - 63	0.0556	- 1.31	RW-3a (ECD# 981-16)	6.1E-02	3	Max. Det. > Bench
5-Nitro-o-toluidine	99-55-8	mg/l	6 - 63	0.00308	- 1.02	MW-10S (ECD#983-28)	2.0E-03	3	Max. Det. > Bench
Aniline	62-53-3	mg/l	5 - 63	0.0262	- 0.994	RW-2a (ECD# 981-15)	1.2E-02	3	Max. Det. > Bench
Barium	7440-39-3	mg/l	25 - 25	0.0391	- 2.27	GM-16S (ECD #981-22)	2.0E+00	2	Max. Det. > Bench
Benzene	71-43-2	mg/l	7 - 61	0.1	- 1.23	RW-2a (ECD# 981-15)	5.0E-03	2	Max. Det. > Bench
Benzoic Acid	65-85-0	mg/l	1 - 63	0.00258	- 0.00258	FP-4(ECD#983-5)	1.5E+02	3	No
bis(2-Chloroethyl)ether	111-44-4	mg/l	1 - 63	1.15	- 1.15	RW-2a (ECD# 981-15)	9.6E-06	3	Max. Det. > Bench
bis(2-Ethylhexyl) phthalate	117-81-7	mg/l	29 - 63	0.00252	- 0.0296	LF-1S (ECD#981-1)	4.8E-03	3	Max. Det. > Bench
Bisphenol A	80-05-7	mg/l	8 - 63	0.00382	- 0.0966	RW-2a (ECD# 981-15)	-		NA
Cadmium	7440-43-9	mg/l	1 - 61	0.0464	- 0.0464	MW-7S (ECD#981-26)	5.0E-03	2	Max. Det. > Bench
Calcium	7440-70-2	mg/l	24 - 24	8.73	- 244	LF-1S (ECD#981-1)	--		NA
Chlorobenzene	108-90-7	mg/l	20 - 61	0.00222	- 178	MW-10S(ECD#983-28)	1.1E-01	3	Max. Det. > Bench
cis-1,2-Dichloroethene	156-59-2	mg/l	4 - 61	0.00249	- 0.00491	LF-4D FD A (ECD#983-2)	7.0E-02	2	No
Copper	7440-50-8	mg/l	12 - 25	0.00702	- 0.247	MW-7S (ECD#981-26)	1.5E+00	3	No
Diethyl phthalate	84-66-2	mg/l	3 - 63	0.00688	- 0.0276	LF-4S (ECD#983-4)	2.9E+01	3	No
Di-n-butyl phthalate	84-74-2	mg/l	3 - 63	0.00268	- 0.00426	LF-4S (ECD#983-4)	3.7E+00	3	No
Di-n-octyl phthalate	117-84-0	mg/l	1 - 63	0.0033	- 0.0033	LF-1S (ECD#981-1)	7.3E-01	3	No
Iron	7439-89-6	mg/l	24 - 25	0.0121	- 42.6	LF-4S (ECD#981-4)	1.1E+01	3	Max. Det. > Bench
Lead	7439-92-1	mg/l	10 - 61	0.00416	- 0.492	MW-7S (ECD#981-26)	--		NA
Magnesium	7439-95-4	mg/l	24 - 24	3.95	- 58	LF-1S (ECD#981-1)	--		NA
Manganese	7439-96-5	mg/l	25 - 25	0.02	- 44.4	LF-1S (ECD#981-1)	7.3E-01	3	Max. Det. > Bench
m-Toluidine	108-44-1	mg/l	2 - 63	0.021	- 0.021	LF-4S (ECD#983-4)	--		NA
Nickel	7440-02-0	mg/l	29 - 61	0.00487	- 0.48	MW-7S (ECD#981-26)	7.3E-01	3	No
Nitrobenzene	98-95-3	mg/l	15 - 62	0.00208	- 2.8	RW-3a (ECD# 981-16)	3.5E-03	3	Max. Det. > Bench
p-Chloroaniline	106-47-8	mg/l	3 - 63	0.00516	- 0.414	LF-4S (ECD#981-4)	1.5E-01	3	Max. Det. > Bench
Phenol	108-95-2	mg/l	12 - 63	0.00122	- 0.00923	RW-1 (ECD#983-14)	2.2E+01	3	No
Potassium	7440-09-7	mg/l	23 - 24	1.28	- 119	LF-4S (ECD#981-4)	--		NA
p-Toluidine	106-49-0	mg/l	3 - 63	0.0117	- 0.244	RW-2a (ECD# 981-15)	3.5E-04	3	Max. Det. > Bench
Sodium	7440-23-5	mg/l	24 - 24	12.2	- 952	GM-5B (ECD #981-19)	--		NA
Tetrahydrofuran	109-99-9	mg/l	1 - 61	0.116	- 0.116	LF-4S (ECD#981-4)	8.8E-03	3	Max. Det. > Bench
Trichloroethylene	79-01-6	mg/l	2 - 61	0.00108	- 0.00115	LF-4D FD B (ECD#983-3)	5.0E-03	2	No
Zinc	7440-66-6	mg/l	18 - 25	0.00517	- 0.5	MW-7S (ECD#981-26)	1.1E+01	3	No

Notes:

(1) In lieu of Federal MCLs, Region III RBCs were used as Benchmark Screening Levels. Remanded MCLs and Federal Action Levels were not considered.

(2) Federal MCL

(3) Region III Risk-Based Concentration for Tap Water.

Only Detected Constituents are presented here.

NA = Not Applicable

-- = Neither a Federal MCL nor a Region III RBC were available.

TABLE 7-2
Screening of Constituents in Off-Site Groundwater (1998)

Constituent	CAS Number	Units	Frequency of Detection	Range of Detections	Sample of Maximum Detection	Benchmark Screening Level ¹	Maximum Detection Exceeds Benchmark
1,1,1,2-Tetrachloroethane	630-20-6	mg/l	0 - 4	ND		--	NA
1,1,1-Trichloroethane	71-55-6	mg/l	0 - 4	ND		--	NA
1,1,2,2-Tetrachloroethane	79-34-5	mg/l	0 - 4	ND		--	NA
1,1,2-Trichloroethane	79-00-5	mg/l	0 - 4	ND		--	NA
1,1-Dichloroethane	75-34-3	mg/l	0 - 4	ND		--	NA
1,1-Dichlorethene	75-35-4	mg/l	0 - 4	ND		--	NA
1,1-Dichloropropene	563-58-6	mg/l	0 - 4	ND		--	NA
1,2,3-Trichlorobenzene	87-61-6	mg/l	0 - 4	ND		--	NA
1,2,3-Trichloropropane	96-18-4	mg/l	0 - 4	ND		--	NA
1,2,4,5-Tetrachlorobenzene	95-94-3	mg/l	0 - 4	ND		--	NA
1,2,4-Trichlorobenzene	120-82-1	mg/l	0 - 4	ND		--	NA
1,2,4-Trimethylbenzene	95-63-6	mg/l	0 - 4	ND		--	NA
1,2-Dibromo-3-chloropropane	96-12-8	mg/l	0 - 4	ND		--	NA
1,2-Dibromoethane	106-93-4	mg/l	0 - 4	ND		--	NA
1,2-Dichlorobenzene	95-50-1	mg/l	0 - 4	ND		--	NA
1,2-Dichloroethane	107-06-2	mg/l	0 - 4	ND		--	NA
1,2-Dichloropropane	78-87-5	mg/l	0 - 4	ND		--	NA
1,3,5-Trimethylbenzene	108-67-8	mg/l	0 - 4	ND		--	NA
1,3-Dichlorobenzene	541-73-1	mg/l	0 - 4	ND		--	NA
1,3-Dichloropropane	142-28-9	mg/l	0 - 4	ND		--	NA
1,4-Dichlorobenzene	106-46-7	mg/l	0 - 4	ND		--	NA
1-Chloronaphthalene	90-13-1	mg/l	0 - 4	ND		--	NA
1-Methylnaphthalene	90-12-0	mg/l	0 - 4	ND		--	NA
1-Naphthylamine	134-32-7	mg/l	0 - 4	ND		--	NA
2,2-Dichloropropane	590-20-7	mg/l	0 - 4	ND		--	NA
2,3,4,6-Tetrachlorophenol	58-90-2	mg/l	0 - 4	ND		--	NA
2,3-Dichloroaniline	608-27-5	mg/l	0 - 4	ND		--	NA
2,4,5-Trichlorophenol	95-95-4	mg/l	0 - 4	ND		--	NA
2,4,6-Trichlorophenol	88-06-2	mg/l	0 - 4	ND		--	NA
2,4-Diaminotoluene	95-80-7	mg/l	0 - 4	ND		--	NA
2,4-Dichlorophenol	120-83-2	mg/l	0 - 4	ND		--	NA
2,4-Dimethylphenol	105-67-9	mg/l	0 - 4	ND		--	NA
2,4-Dinitrophenol	51-28-5	mg/l	0 - 4	ND		--	NA
2,4-Dinitrotoluene	121-14-2	mg/l	0 - 4	ND		--	NA
2,6-Dichlorophenol	87-65-0	mg/l	0 - 4	ND		--	NA
2,6-Dinitrotoluene	606-20-2	mg/l	0 - 4	ND		--	NA
2-Butanone	78-93-3	mg/l	0 - 4	ND		--	NA
2-Chloroethyl vinyl ether	110-75-8	mg/l	0 - 4	ND		--	NA
2-Chloronaphthalene	91-58-7	mg/l	0 - 4	ND		--	NA
2-Chlorophenol	95-57-8	mg/l	0 - 4	ND		--	NA
2-Chlorotoluene	95-49-8	mg/l	0 - 4	ND		--	NA
2-Hexanone	591-78-6	mg/l	0 - 4	ND		--	NA
2-Methylacetonitrile	107-12-0	mg/l	0 - 4	ND		--	NA
2-Methylnaphthalene	91-57-6	mg/l	0 - 4	ND		--	NA
2-Methylpyridine	109-06-8	mg/l	0 - 4	ND		--	NA
2-Naphthylamine	91-59-8	mg/l	0 - 4	ND		--	NA
2-Nitroaniline	88-74-4	mg/l	0 - 4	ND		--	NA
2-Nitrophenol	88-75-5	mg/l	0 - 4	ND		--	NA
2-Nitropropane	79-46-9	mg/l	0 - 4	ND		--	NA
2-Nitrotoluene	88-72-2	mg/l	0 - 4	ND		--	NA
3,3'-Dichlorobenzidine	91-94-1	mg/l	0 - 4	ND		--	NA
3-Chloropropene	107-05-1	mg/l	0 - 4	ND		--	NA
3-Methylcholanthrene	56-49-5	mg/l	0 - 4	ND		--	NA
3-Nitroaniline	99-09-2	mg/l	0 - 4	ND		--	NA
3-Nitrotoluene	99-08-1	mg/l	0 - 4	ND		--	NA
4,6-Dinitro-o-cresol	534-52-1	mg/l	0 - 4	ND		--	NA
4-Aminobiphenyl	92-67-1	mg/l	0 - 4	ND		--	NA
4-Bromophenyl phenylether	101-55-3	mg/l	0 - 4	ND		--	NA
4-Chlorophenyl phenylether	7005-72-3	mg/l	0 - 4	ND		--	NA
4-Nitroaniline	100-01-6	mg/l	0 - 4	ND		--	NA
4-Nitrophenol	100-02-7	mg/l	0 - 4	ND		--	NA
4-Nitrotoluene	99-99-0	mg/l	0 - 4	ND		--	NA
5-Nitro-o-toluidine	99-55-8	mg/l	0 - 4	ND		--	NA

TABLE 7-2
Screening of Constituents in Off-Site Groundwater (1998)

Constituent	CAS Number	Units	Frequency of Detection	Range of Detections	Sample of Maximum Detection	Benchmark Screening Level ¹	Maximum Detection Exceeds Benchmark
Acenaphthene	83-32-9	mg/l	0 - 4	ND		--	NA
Acenaphthylene	208-96-8	mg/l	0 - 4	ND		--	NA
Acetone	67-64-1	mg/l	1 - 4	0 - 0	CAINS (ECD#982-8)	6.1E-01	No
Acetophenone	98-86-2	mg/l	0 - 4	ND		--	NA
Acraldehyde	107-02-8	mg/l	0 - 4	ND		--	NA
Acrylonitrile	107-13-1	mg/l	0 - 4	ND		--	NA
Aniline	62-53-3	mg/l	0 - 4	ND		--	NA
Anthracene	120-12-7	mg/l	0 - 4	ND		--	NA
Azobenzene	103-33-3	mg/l	0 - 4	ND		--	NA
Benzene	71-43-2	mg/l	0 - 4	ND		--	NA
Benzidine	92-87-5	mg/l	0 - 4	ND		--	NA
Benzo(a)anthracene	56-55-3	mg/l	0 - 4	ND		--	NA
Benzo(a)pyrene	50-32-8	mg/l	0 - 4	ND		--	NA
Benzo(b)fluoranthene	205-99-2	mg/l	0 - 4	ND		--	NA
Benzo(g,h,i)perylene	191-24-2	mg/l	0 - 4	ND		--	NA
Benzo(k)fluoranthene	207-08-9	mg/l	0 - 4	ND		--	NA
Benzoic Acid	65-85-0	mg/l	0 - 4	ND		--	NA
Benzyl alcohol	100-51-6	mg/l	0 - 4	ND		--	NA
bis(2-Chloroethoxy)methane	111-91-1	mg/l	0 - 4	ND		--	NA
bis(2-Chloroethyl)ether	111-44-4	mg/l	0 - 4	ND		--	NA
bis(2-Chloroisopropyl)ether	108-60-1	mg/l	0 - 4	ND		--	NA
bis(2-Ethylhexyl) phthalate	117-81-7	mg/l	0 - 4	ND		--	NA
Bisphenol A	80-05-7	mg/l	0 - 4	ND		--	NA
Bromobenzene	108-86-1	mg/l	0 - 4	ND		--	NA
Bromodichloromethane	75-27-4	mg/l	0 - 4	ND		--	NA
Bromomethane	74-83-9	mg/l	0 - 4	ND		--	NA
Butyl benzyl phthalate	85-68-7	mg/l	0 - 4	ND		--	NA
Cadmium	7440-43-9	mg/l	0 - 4	ND		--	NA
Carbazole	86-74-8	mg/l	0 - 4	ND		--	NA
Carbon disulfide	75-15-0	mg/l	0 - 4	ND		--	NA
Carbon tetrachloride	56-23-5	mg/l	0 - 4	ND		--	NA
Chloroacetonitrile	107-14-2	mg/l	0 - 4	ND		--	NA
Chlorobenzene	108-90-7	mg/l	0 - 4	ND		--	NA
Chlorobromomethane	74-97-5	mg/l	0 - 4	ND		--	NA
Chlorobutane, 1-	109-69-3	mg/l	0 - 4	ND		--	NA
Chloroethane	75-00-3	mg/l	0 - 4	ND		--	NA
Chloromethane	74-87-3	mg/l	0 - 4	ND		--	NA
Chrysene	218-01-9	mg/l	0 - 4	ND		--	NA
cis-1,2-Dichloroethene	156-59-2	mg/l	0 - 4	ND		--	NA
cis-1,3-Dichloro-1-propene	10061-01-5	mg/l	0 - 4	ND		--	NA
Cyclohexanone	108-94-1	mg/l	0 - 4	ND		--	NA
Dibenz(a,h)anthracene	53-70-3	mg/l	0 - 4	ND		--	NA
Dibenzofuran	132-64-9	mg/l	0 - 4	ND		--	NA
Dibromochloromethane	124-48-1	mg/l	0 - 4	ND		--	NA
Dibromomethane	74-95-3	mg/l	0 - 4	ND		--	NA
Dichlorodifluoromethane	75-71-8	mg/l	0 - 4	ND		--	NA
Diethyl ether	60-29-7	mg/l	0 - 4	ND		--	NA
Diethyl phthalate	84-66-2	mg/l	0 - 4	ND		--	NA
Dimethylphthalate	131-11-3	mg/l	0 - 4	ND		--	NA
Di-n-butyl phthalate	84-74-2	mg/l	0 - 4	ND		--	NA
Di-n-octyl phthalate	117-84-0	mg/l	0 - 4	ND		--	NA
Ethyl methacrylate	97-63-2	mg/l	0 - 4	ND		--	NA
Ethylbenzene	100-41-4	mg/l	0 - 4	ND		--	NA
Fluoranthene	206-44-0	mg/l	0 - 4	ND		--	NA
Fluorene	86-73-7	mg/l	0 - 4	ND		--	NA
Heptachlor	76-44-8	mg/l	0 - 4	ND		--	NA
Hexachlorobenzene	118-74-1	mg/l	0 - 4	ND		--	NA
Hexachlorobutadiene	87-68-3	mg/l	0 - 4	ND		--	NA
Hexachlorocyclopentadiene	77-47-4	mg/l	0 - 4	ND		--	NA
Hexachloroethane	67-72-1	mg/l	0 - 4	ND		--	NA
Indeno(1,2,3-cd)pyrene	193-39-5	mg/l	0 - 4	ND		--	NA
Iodomethane	74-88-4	mg/l	0 - 4	ND		--	NA
Isophorone	78-59-1	mg/l	0 - 4	ND		--	NA

TABLE 7-2
Screening of Constituents in Off-Site Groundwater (1998)

Constituent	CAS Number	Units	Frequency of Detection	Range of Detections	Sample of Maximum Detection	Benchmark Screening Level ¹	Maximum Detection Exceeds Benchmark
Isopropylbenzene	98-82-8	mg/l	0 - 4	ND		--	NA
Lead	7439-92-1	mg/l	0 - 4	ND		--	NA
m-Cresol	108-39-4	mg/l	0 - 4	ND		--	NA
Methacrylonitrile	126-98-7	mg/l	0 - 4	ND		--	NA
Methyl acrylate	96-33-3	mg/l	0 - 4	ND		--	NA
Methyl methacrylate	80-62-6	mg/l	0 - 4	ND		--	NA
Methylene chloride	75-09-2	mg/l	0 - 4	ND		--	NA
m-Toluidine	108-44-1	mg/l	0 - 4	ND		--	NA
m-Xylene	108-38-3	mg/l	0 - 4	ND		--	NA
Naphthalene	91-20-3	mg/l	0 - 4	ND		--	NA
n-Butylbenzene	104-51-8	mg/l	0 - 4	ND		--	NA
Nickel	7440-02-0	mg/l	0 - 4	ND		--	NA
Nitrobenzene	98-95-3	mg/l	0 - 4	ND		--	NA
N-Nitrosodimethylamine	62-75-9	mg/l	0 - 4	ND		--	NA
N-Nitrosodi-n-butylamine	924-16-3	mg/l	0 - 4	ND		--	NA
n-Nitroso-di-n-propylamine	621-64-7	mg/l	0 - 4	ND		--	NA
n-Nitrosodiphenylamine	86-30-6	mg/l	0 - 4	ND		--	NA
N-Nitrosopiperidine	100-75-4	mg/l	0 - 4	ND		--	NA
n-Propylbenzene	103-65-1	mg/l	0 - 4	ND		--	NA
o-Cresol	95-48-7	mg/l	0 - 4	ND		--	NA
o-Xylene	95-47-6	mg/l	0 - 4	ND		--	NA
p-Acetophenetidide	62-44-2	mg/l	0 - 4	ND		--	NA
p-Chloroaniline	106-47-8	mg/l	0 - 4	ND		--	NA
p-Chloro-m-cresol	59-50-7	mg/l	0 - 4	ND		--	NA
p-Chlorotoluene	106-43-4	mg/l	0 - 4	ND		--	NA
p-Cymene	99-87-6	mg/l	0 - 4	ND		--	NA
p-Dimethylaminoazobenzene	60-11-7	mg/l	0 - 4	ND		--	NA
Pentachlorobenzene	608-93-5	mg/l	0 - 4	ND		--	NA
Pentachloroethane	76-01-7	mg/l	0 - 4	ND		--	NA
Pentachloronitrobenzene	82-68-8	mg/l	0 - 4	ND		--	NA
Pentachlorophenol	87-86-5	mg/l	0 - 4	ND		--	NA
Phenanthrene	85-01-8	mg/l	0 - 4	ND		--	NA
Phenol	108-95-2	mg/l	1 - 4	0 - 0	RICHMOND (ECD#982-10)	2.2E+01	No
p-Toluidine	106-49-0	mg/l	0 - 4	ND		--	NA
Pyrene	129-00-0	mg/l	0 - 4	ND		--	NA
Pyridine	110-86-1	mg/l	0 - 4	ND		--	NA
sec-Butylbenzene	135-98-8	mg/l	0 - 4	ND		--	NA
Styrene	100-42-5	mg/l	0 - 4	ND		--	NA
tert-Butylbenzene	98-06-6	mg/l	0 - 4	ND		--	NA
Tetrachloroethene	127-18-4	mg/l	0 - 4	ND		--	NA
Tetrahydrofuran	109-99-9	mg/l	0 - 4	ND		--	NA
Toluene	108-88-3	mg/l	0 - 4	ND		--	NA
trans-1,2-Dichloroethene	156-60-5	mg/l	0 - 4	ND		--	NA
trans-1,3-Dichloropropene	10061-02-6	mg/l	0 - 4	ND		--	NA
trans-1,4-Dichloro-2-butene	110-57-6	mg/l	0 - 4	ND		--	NA
Tribromomethane	75-25-2	mg/l	0 - 4	ND		--	NA
Trichloroethene	79-01-6	mg/l	0 - 4	ND		--	NA
Trichlorofluoromethane	75-69-4	mg/l	0 - 4	ND		--	NA
Trichloromethane	67-66-3	mg/l	0 - 4	ND		--	NA
Trimethylphosphate	512-56-1	mg/l	0 - 4	ND		--	NA
Triphenyl phosphate	115-86-6	mg/l	0 - 4	ND		--	NA
Vinyl acetate	108-05-4	mg/l	0 - 4	ND		--	NA
Vinyl Chloride	75-01-4	mg/l	0 - 4	ND		--	NA

Notes:

ND = Not Detected

NA = Not Applicable

(1) = Federal MCLs were used as Benchmark Screening Levels; where MCLs are not available, Region III Tap Water RBCs were used.

Since MCLs are not available for the detected constituents, the screening levels cited are USEPA Region III RBCs for Tap Water.

--" = Screening Benchmark Levels not presented for non-detected constituents.

8.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

8.1 SUMMARY

Bayer Corporation has conducted a RFI at their New Martinsville, West Virginia facility. The RFI was completed in accordance with the requirements in the facility's RCRA permit for Corrective Action and Waste Minimization (WVD 05 686 6312). A total of 30 SWMUs were investigated as part of the RFI. The overall objectives of the RFI included the following:

- Characterize the soils in the vicinity of each SWMU
- Define the nature and extent of constituents in soils which may pose a human health and/or ecological risk
- Assess risks to human health and the environment based on chemical data from each SWMU
- Identify SWMUs which require a CMS based on identified risks.

The media potentially affected by releases at the site and evaluated in the RFI include soil, surface water, groundwater, and sediments.

The conclusions and recommendations presented in this report are based on the combined results of all three RFI Phases. Soils were investigated on a SWMU basis during Phases 1 and 2 of the RFI and groups of SWMUs in Phase 3 of the RFI. The SWMUs were grouped on proximity, historical knowledge, and analytical results. Soil conditions at the SWMUs were characterized through:

- Collection of more than 1,700 EM readings
- GPR surveys in 4 SWMUs
- Collection of approximately 800 soil gas samples
- Installation of approximately 150 test borings
- Collection and laboratory analyses of approximately 500 soil samples

Human health risk was a critical component in the interpretation of soil, surface water and sediment data and in the RFI decision-making process. The primary purpose of the risk assessment at the Bayer facility was to decide the appropriate corrective action to take, if any, for soil at each SWMU or SWMU group. The risk assessment considered both residential and industrial land use. However, because Bayer is an active industrial facility and has been

recognized as such by the USEPA, all recommendations for corrective action were based on the assumption of continued industrial land use into the future.

A screening-level groundwater risk evaluation was performed by comparing 1998 quarterly groundwater monitoring data to established water quality criteria.

8.2 CONCLUSIONS

The RFI has provided the data needed to define surface and subsurface conditions, nature and extent of constituents, potential risks to human health and the environment, and the appropriate action for soils at each of the 14 individual SWMUs and 5 SWMU groups. Table 8-1 provides a summary of the status of each SWMU or SWMU group relative to the need for further action.

As indicated in Table 8-1, the RFI data for the 14 individual SWMUs were discussed in detail via telephone conference calls with USEPA following submittal of the Phase 2 Technical Memorandum. These tables reflect the results of the discussions with USEPA. The 14 individual SWMUs required no further investigation and were placed in the no further action category. However, institutional controls to protect workers from potential exposure to subsurface soils are required at the following SWMUs: SWMU 13, SWMU 18, SWMU 19, SWMU 22, SWMU 25, and SWMU 30,

Surface water and sediments of Beaver Run were also placed in the no further evaluation and no further action category following the submission of the Phase 2 Technical Memorandum and subsequent discussions with USEPA.

Bayer has concluded that SWMUs 21, 22 and the remaining 4 SWMU Groups, which include 14 of the original 30 SWMUs, that were evaluated further during Phase 3 require no further action for reasons summarized in Section 4 of this report. Bayer recommends institutional controls at each of the SWMUs and SWMU groups evaluated during Phase 3. Concerns associated with potential leaching to groundwater from these SWMUs will be evaluated as part of the groundwater CMS.

8.3 RECOMMENDATIONS

Based on the RFI findings all 30 of the SWMUs are recommended for no further action for the direct exposure pathway. This included 14 of the SWMUs discussed in detail with USEPA

following Phase 2 of the RFI, SWMUs 21 and 22, and the 4 SWMU Groups, which included 14 of the remaining 16 SWMUs, evaluated in Phase 3.

Due to potential concerns with subsurface soils, SWMU Groups A through D and SWMU 30 will be included in an institutional control plan covering subsurface work. A soil management plan will be included in the institutional control requirements for SWMU 30.

A groundwater CMS is recommended to evaluate technologies to expedite restoration of groundwater quality. As indicated in Section 4 of this report, this may include addressing potential leaching to groundwater associated with some of the Phase 3 SWMUs/SWMU groups.

To reduce infiltration of precipitation, an engineered soil cover with permeability requirements is recommended as a presumptive remedy for SWMU Group A. As part of this remedy, Beaver Run is to be rerouted to eliminate potential future impact on surface water and potential hazards due to stream erosion.

TABLE 8-1
SWMU STATUS SUMMARY

SWMU Group	SWMU Number	Name	Status	Institutional Controls
A	1	South Landfill	Presumptive Remedy Required (engineered soil cover)	Required
	2	Sludge Lagoon		
	3	Fill Area, Hydroblasting Station		
	4	Ash Lagoon		
B	5	Residue Fill Area, Unit Fc	NFA	Required
	6	Residue Fill Area, Unit Fd		
C	7	Fill Materials, Block 21	NFA	Required
	8	All Purpose Burning Pit		
	9	Residue Fill Area, Unit 3 Fe		
	11	Acid Neutralization Spill Basin		
D	10	Infilled Wastewater Ditch	NFA	Required
	12	Former Neutralization Spill Basin		
	15	Neutralization and Settling Basin, 5Fa		
	16	Neutralization Basin 5Fe		
N/A	21	Nitrations Neutralization Settling Basin 5Fb	NFA	Required
N/A	27	Mononitrobenzene Area	NFA	Required
N/A	13	Existing Process Trench	NFA	Required
N/A	14	Fill Materials, Block 11	NFA	
N/A	17	Polyol Spill Area	NFA	
N/A	18	Lab Area 24A	NFA	Required
N/A	19	Residue Fill Area, Unit 3Fa	NFA	Required
N/A	20	Nitrations Neutralization Settling Basin 5Fb	NFA	
N/A	22	Vortex Burner	NFA	Required
N/A	23	TDI Area 26B	NFA	
N/A	24	Neutralization Trench/Basin 5Fd	NFA	
N/A	25	HCL Area 15C	NFA	Required
N/A	26	Former Waste Disposal Incinerator	NFA	
N/A	28	Iron Oxide Area 28A	NFA	
N/A	29	Fill Materials Block 28	NFA	
N/A	30	Residue Fill Area, Unit 3Fb	NFA	Required

N/A = Not Applicable

NFA = No Further Action

9.0 REFERENCES

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USEPA's 1992 Law Use in the CERCLA Response Process: OSWER Directive N

Über Einflussfaktoren der Anwendung von EKG- und Ultraschallgeräten im ambulanten Bereich

The BVI Board of Control of Solid Waste Management Act, 1995, which was passed by the Legislative Assembly of the British Virgin Islands on May 1, 1995, came into force on July 1, 1995.